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VOL. I

AN INTRODUCTION TO THE
STUDY OF MAN AND CIVILIZATION

SIR E. B. TYLOR, Kt.

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ANTHROPOLOGY:

AN INTRODUCTION TO THE STUDY OF MAN AND CIVILIZATION

VOL. I

BY

SIR EDWARD B. TYLOR, KT.,

D.C.L., LL.D., F.R.S.

WITH INTRODUCTION BY

A. C. HADDON,

SC.D., F.R.S.

WITH ILLUSTRATIONS

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Dr. Tylor from 1861 to 1907, compiled by Miss Freire-Marreco for the above-mentioned *Essays*, it is obvious that, apart from his four books, his activity largely manifested itself in lectures, reviews, and addresses. His papers, even when descriptive, were always marked by a breadth of view and an endeavour to drive home the lessons to be garnered from the facts. There were few aspects of Anthropology which he had not investigated, and he enriched all those with which he dealt. He was always interested in method, and it was mainly by his efforts in this direction that ethnology could claim to be recognized as a science.

It was a happy chance that brought Tylor at the age of twenty-four into contact with Henry Christy in Cuba in 1856. They then arranged to travel together in Mexico, and as a result of this expedition Tylor published his first book, *Anahuac ; or Mexico and the Mexicans, Ancient and Modern* (1861). The magnificent ethnographical and archæological collections amassed by Christy were bequeathed by him to the nation, and are now lodged in the British Museum. It was due to Christy's influence that the career of the young engineer became deflected towards man and his works.

On the publication of *Researches into the Early History of Mankind and the Development of Civilization* (1865) the wide reading and sound generalizations of the young author were immediately appreciated. Six years later appeared *Primitive Culture : Researches into the Development of Mythology, Philosophy, Religion, Language, Art, and Custom* (2 vols., 1871), which exhibited the extent of Tylor's erudition, his critical acumen, accuracy, power of exposition, his open mind and scientific caution, which were combined with a happy simplicity and unobtrusive humour of style. The work was at once recognized as a " classic," and such it has remained.

In the earlier book Dr. Tylor's attitude was on the whole clearly in favour of the diffusion of culture, and tended more to a theory of the borrowing of myths and folk-tales than Andrew Lang, for example, had ever

been disposed to accept. In his Preface to the second edition (1873) of the later book the author describes it as " a work on civilization insisting so strenuously on a theory of development or evolution."

It has been stated that " the late Sir Edward Tylor, perhaps more than any other scholar, was responsible for securing recognition for the speculations of Waitz and Bastian claiming the independent evolution of customs and beliefs; or perhaps it would be more correct to say the hypothesis which these German ethnologists borrowed directly or indirectly from the Scottish historian Robertson, who in 1788 enunciated it in his *History of America*. Without Tylor's persistent advocacy such doctrines would not have received credence on the part of serious men, but would have lapsed into the oblivion from which they should never have emerged. In spite of this unfortunate disservice to ethnology, Tylor was not a partisan, but a truly scientific man. He was not defending a dogma, but seeking for the truth; hence he did not hesitate to call attention to certain important evidence that was not in accordance with the hypothesis of independent development, for which he was himself the chief sponsor " (G. Elliot Smith, *Elephants and Ethnologists*, 1924, p. 34). Professor Elliot Smith did call attention to Dr. Tylor's paper to Section H of the British Association at Oxford in 1894, " On the Diffusion of Mythical Beliefs as Evidence in the History of Culture," in which he illustrated " the use of correspondence in culture as a means of tracing lines of connection and intercourse between ancient and remote peoples. Mythical beliefs are especially referred to as furnishing good evidence of this class, notwithstanding their want of objective value." He noted that there was an absolute correspondence between the dangers believed in Ancient Mexico to be encountered by the journey of the soul in the land of the dead and the scenes of the Buddhist hells or purgatories as depicted on Japanese temple scrolls. He referred to " Humboldt's argument from the calendars

and mythic catastrophes in Mexico and Asia, and to the correspondence in Bronze Age work and in games in both regions," and expressed " the opinion that on these cumulative proofs anthropologists might well feel justified in treating the nations of America as having reached their level of culture under Asiatic influence " (Report Brit. Assoc., 1894, p. 775).

Dr. Tylor belonged to that great period when Evolution was, so to speak, " in the air," when Herbert Spencer, Charles Darwin, Huxley, Lyell, Lubbock (afterwards Lord Avebury), and others, were broadening the outlook on nature and man. Even as early as 1851, Col. Lane-Fox (afterwards Pitt-Rivers) began to collect ethnological specimens in order to see whether there was that same unfailing regularity of the process of gradual evolution in the arts, appliances, and ideas of mankind which he had noted in the case of fire-arms. These collections are now enshrined in the famous Pitt-Rivers Museum at Oxford, in which Tylor took great delight, and which he did much to improve. It is, therefore, not surprising that Tylor was interested in tracing evolutionary processes in custom and belief. The most ardent diffusionists must admit that an evolution has taken place, but they claim that this development took place in one centre only and thence spread over the face of the earth.

At the time that Tylor was beginning his investigations the exploration of Brixham Cave (1858) firmly established the contemporary existence of man with Pleistocene fauna, and about the same time a party of English archæologists definitely established the authenticity of the discoveries by Boucher de Perthes of flint implements in river gravels. All these exciting demonstrations were made by friends of Tylor's, and they helped to determine the trend of his thought.

The first edition of *Anthropology* was published in 1881, and on referring to the Preface it will be seen that Dr. Tylor felt, and rightly so, that a book giving a bird's-eye view of the subject would rather lighten than increase the strain of learning. His aim was to give an

introduction to Anthropology rather than a summary of all it teaches, and in the task he had set himself he asks that errors and imperfections should be lightly judged on account of the multifarious departments of the science of Man.

The book has amply fulfilled the hopes of the author, as is proved by the half-dozen subsequent editions and by the generations of students and other readers who have benefited by this admirable survey. It is evident in reading the book that it was written by one who had made himself a master of the various branches of Anthropology and had pondered over its problems. One feels that, like an iceberg, only a fraction is apparent compared with what lies below the surface.

It may be asked, Why should the book be again reprinted in its original form? The answer is that there is no one competent to write a new work on similar lines. Doubtless a syndicate could be formed which might undertake to do this; but the contributions would probably fail in producing a well-balanced whole, and certainly the easy style and unity of thought which renders *Anthropology* so coherent would be lost.

Further, it might be suggested that the book should have been brought up to date. No one who has attempted so thankless a task would willingly try again to make a patchwork. The introduction of footnotes or appendices would destroy the pleasant character of the work, and possibly might be distasteful to those readers for whom it was partly intended.

It is true that in all the subjects dealt with there have been many, and in some cases profound, additions to our knowledge, and also that the sociological and magico-religious problems have been approached from different angles. Many new lines of study have been opened up and will be in the future, for the science of Anthropology is, after all, but a recent one and its methods and terminology are not yet stable.

A. C. Haddon.

AUTHOR'S PREFACE

In times when subjects of education have multiplied, it may seem at first sight a hardship to lay on the already heavily-pressed student a new science. But it will be found that the real effect of Anthropology is rather to lighten than increase the strain of learning. In the mountains we see the bearers of heavy burdens contentedly shoulder a carrying-frame besides, because they find its weight more than compensated by the convenience of holding together and balancing their load. So it is with the science of Man and Civilization, which connects into a more manageable whole the scattered subjects of an ordinary education. Much of the difficulty of learning and teaching lies in the scholar's not seeing clearly what each science or art is for, what its place is among the purposes of life. If he knows something of its early history, and how it arose from the simpler wants and circumstances of mankind, he finds himself better able to lay hold of it than when, as too often happens, he is called on to take up an abstruse subject not at the beginning but in the middle. When he has learnt something of man's rudest means of conversing by gestures and cries, and thence has been led to see how the higher devices of articulate speech are improvements on such lower methods, he makes a fairer start in the science of language than if he had fallen unprepared among the subtleties of grammar, which unexplained look like arbitrary rules framed to perplex rather than to inform. The dislike of so many beginners to geometry as expounded by Euklid, the fact that not one out of three ever really understands what he is doing, is of all things due to the scholar not being shown first the practical common-sense starting-point, where the old carpenters and builders began to make out the relations of distances and spaces in their work. So the law-student plunges at once into the intricacies of legal systems which have grown up through the struggles, the

reforms, and even the blunders of thousands of years; yet he might have made his way clearer by seeing how laws begin in their simplest forms, framed to meet the needs of savage and barbaric tribes. It is needless to make a list of all the branches of education in knowledge and art; there is not one which may not be the easier and better learnt for knowing its history and place in the general science of Man.

With this aim in view, the present volume is an introduction to Anthropology, rather than a summary of all it teaches. It does not deal with strictly technical matter, out of the reach of readers who have received, or are receiving, the ordinary higher English education. Thus, except to students trained in anatomy, the minute modern researches as to distinction of races by skull measurements and the like would be useless. Much care has been taken to make the chapters on the various branches of the science sound as far as they go, but the more advanced work must be left to special students.

While the various departments of the science of Man are extremely multifarious, ranging from body to mind, from language to music, from fire-making to morals, they are all matters to whose nature and history every well-informed person ought to give some thought. It is much, however, for any single writer to venture to deal even in the most elementary way with so immense a variety of subjects. In such a task I have the right to ask that errors and imperfections should be lightly judged. I could not have attempted it at all but for the help of friends eminent in various branches of the science, whom I have been able to consult on doubtful and difficult points. My acknowledgments are especially due to Professor Huxley and Dr. E. A. Freeman, Sir Henry Maine, Dr. Birch, Mr. Franks, Professor Flower, Major-General Pitt-Rivers, Professor Sayce, Dr. Beddoe, Dr. D. H. Tuke, Professor W. K. Douglas, Mr. Russell Martineau, Mr. R. Garnett, Mr. Henry Sweet, Mr. Rudler, and many other friends whom I can only thank unnamed. The illustrations of races are engraved from photographic portraits, many of them taken by the permission of Messrs. Dammann of Huddersfield from their valuable Albums of Ethnological Photographs.

E. B. T.

February, 1881.

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ANTHROPOLOGY

CHAPTER I

MAN, ANCIENT AND MODERN

Antiquity of Man, 1—Time required for Development of Races, 1—of Languages, 5—of Civilization, 10—Traces of Man in the Stone Age, 19—Later Period, 20—Earlier Quaternary or Drift-Period, 22.

THE student who seeks to understand how mankind came to be as they are, and to live as they do, ought first to know clearly whether men are new-comers on the earth, or old inhabitants. Did they appear with their various races and ways of life ready-made, or were these shaped by the long, slow growth of ages? In order to answer this question, our first business will be to take a rapid survey of the varieties of men, their languages, their civilization, and their ancient relics, to see what proofs may thus be had of man's age in the world. The outline sketch thus drawn will also be useful as an introduction to the fuller examination of man and his ways of life in the chapters which follow.

First, as to the varieties of mankind. Let us suppose ourselves standing at the docks in Liverpool or London, looking at groups of men of races most different from our own. There is the familiar figure of the African negro, with skin so dark-brown as to be popularly called black, and black hair so naturally frizzed as to be called woolly. Nor are these the only points in which he is unlike us. Indeed, the white men who blacken their faces and friz their hair to look like negroes make a very poor imitation, for the negro features are quite distinct; we well know the flat nose, wide nostrils, thick protruding lips, and, when the face is seen in profile, the remarkable projecting jaws. A hatter would at once notice that the negro's head is narrower in proportion than the usual

oval of the hats made for Englishmen. It would be possible to tell a negro from a white man even in the dark by the peculiar satiny feel of his skin, and the yet more peculiar smell which no one who has noticed it is ever likely to mistake. In the same docks, among the crews of Eastern steamers, we observe other well-marked types of man. Indigenous peoples of Southern India are represented by men unlike the lighter-complexioned high-caste Hindus, dark-brown of skin, with black, silky, wavy hair, and a face wide-nosed, heavy-jawed, fleshy-lipped. More familiar is the Chinese, whom the observer marks down by his less than European stature, his jaundice-yellow skin, and coarse, straight black hair; the special character of his features is neatly touched off on his native china-plates and paper-screens which show the snub nose, high cheek-bones, and that curious slanting set of the eyes which we can imitate by putting a finger near the outer corners of our own eyes and pushing upward. By comparing such a set of races with our own countrymen, we are able to make out the utmost differences of complexion and feature among mankind. While doing so, it is plain that white men, as we agree to call ourselves, show at least two main race-types. Going on board a merchant-ship from Copenhagen, we find the crew mostly blue-eyed men of fair complexion and hair, a remarkable contrast to the Genoese vessel moored alongside, whose sailors show almost to a man swarthy complexions and lustrous black eyes and hair. These two types of man have been well described as the fair-whites and the dark-whites.

It is only within modern times that the distinctions among races have been worked out by scientific methods. Yet since early ages, race has attracted notice from its connexion with the political questions of countryman or foreigner, conqueror or conquered, freeman or slave, and in consequence its marks have been watched with jealous accuracy. In the Southern United States, till slavery was done away a few years ago, the traces of negro descent were noted with the utmost nicety. Not only were the mixed breeds regularly classed as mulattos, quadroons, and down to octaroons, but even where the mixture was so slight that the untrained eye noticed nothing beyond a brunette complexion, the intruder who had ventured to sit down at a public dinner-table was called upon to show his hands, and the African taint detected by the dark tinge at the root of the finger-nails.

Seeing how striking the broad distinctions of race are, it was to be expected that ancient inscriptions and figures should give some view of the races of man as they were at the beginning of historical times. It is so in Egypt, where the oldest writings of the world appear. More than 4000 years ago we begin to find figures of the Egyptians themselves, in features much the same as in later times. In the sixth dynasty, beyond 3000 B.C., the celebrated inscription of Prince Una makes mention of the *Nahsi*, or negroes, who were levied and drilled by ten thousands for the Egyptian army. Under the twelfth dynasty, on the walls of the tomb of Knumhetp, there is represented a procession of *Amu*, who are seen by their features to be of the race to which Syrians and Hebrews belonged. Especially the wall-paintings of the tomb of Rekh-ma-ra at Thebes, of the eighteenth dynasty, have preserved coloured portraits of the four great races distinguished by the Egyptians. These are the red-brown Egyptians themselves, the people of Palestine with their aquiline profile and brownish complexion, the flat-nosed, thick-lipped African negroes, and the fair-skinned Libyans. Thus mankind was already divided into well-marked races, distinguished by colour and features. It is surprising to notice how these old-world types of man are still to be recognized. The Ethiopian of the ancient monuments can at this day be closely matched. Notwithstanding the many foreign invasions of Egypt, the mass of the village population is true-bred enough for men to be easily picked out as representatives of the times of the Pharaohs. Their portraits have only to be drawn in the stiff style of the monuments, with the eye conventionally shown full-front in the profile face, and we have before us the very Egyptians as they depicted themselves in the old days when they held the Israelites in bondage. In the same way, the ancient Assyrian portraits of the tribute-bearers of Jehu, King of Israel, show the strongly-marked Israelite type of features to be seen at this day in every city of Europe. Altogether, the evidence of ancient monuments, geography, and history, goes to prove that the great race-divisions of mankind are of no recent growth, but were already settled before the beginning of the historical period. Since then their changes seem to have been comparatively slight, except in the forming of mixed races by intermarriage.

Hence it follows that the historic ages are to be looked

on as but the modern period of man's life on earth. Behind them lies the prehistoric period, when the chief work was done of forming and spreading over the world the races of mankind. Though there is no scale to measure the length of this period by, there are substantial reasons for taking it as a long stretch of time. Looking at an ethnological map, coloured to show what race of men inhabits each region, it is plain at a glance that the world was not peopled by mere chance scattering of nations, a white tribe here and a brown tribe there, with perhaps a black tribe in between. Far from this, whole races are spread over vast regions as though they grew there, and the peculiar type of the race seems more or less connected with the climate it lives in. Especially it is seen that the mass of black races belong to the equatorial regions in Africa and the Eastern Archipelago, the yellow race to Central and Southern Asia, the white race to temperate Asia and Europe. Some guess may even be made from the map which district was the primitive centre where each of these races took shape, and whence it spread far and wide. Now if, as some have thought, the Negroes, Mongolians, Whites, and other races, were distinct species, each sprung from a separate origin in its own region, then the peopling of the globe might require only a moderate time, the races having only to spread each from its own birthplace. But the opinion of modern zoologists, whose study of the species and breeds of animals makes them the best judges, is against this view of several origins of man, for two principal reasons. First, that all tribes of men, from the blackest to the whitest, the most savage to the most cultured, have such general likeness in the structure of their bodies and the working of their minds, as is easiest and best accounted for by their being descended from a common ancestry, however distant. Second, that all the human races, notwithstanding their form and colour, appear capable of freely intermarrying and forming crossed races of every combination, such as the millions of mulattos and mestizos sprung in the New World from the mixture of Europeans, Africans, and native Americans; this again points to a common ancestry of all the races of man. We may accept the theory of the unity of mankind as best agreeing with ordinary experience and scientific research. As yet, however, the means are very imperfect of judging what man's progenitors were like in body and mind, in times before the forefathers of

the present Negroes, and Tatars, and Australians, had become separated into distinct stocks. Nor is it yet clear by what causes these stocks or races passed into their different types of skull and limbs, of complexion and hair. It cannot be at present made out how far the peculiarities of single ancestors were inherited by their descendants and became stronger by in-breeding; how far, when the weak and dull-witted tribes failed in the struggle for land and life, the stronger, braver, and abler tribes survived to leave their types stamped on the nations sprung from them; how far whole migrating tribes underwent bodily alteration through change of climate, food, and habits, so that the peopling of the earth went on together with the growth of fresh races fitted for life in its various regions. Whatever share these causes and others yet more obscure may have had in varying the races of man, it must not be supposed that such differences as between an Englishman and a Gold Coast negro are due to slight variations of breed. On the contrary, they are of such zoological importance as to have been compared with the differences between animals which naturalists reckon distinct species, as between the brown bear with its rounded forehead, and the polar bear with its whitish fur and long flattened skull. If then we are to go back in thought to a time when the ancestors of the African, the Australian, the Mongol, and the Scandinavian, were as yet one undivided stock, the theory of their common descent must be so framed as to allow causes strong enough and time long enough to bring about changes far beyond any known to have taken place during historical ages. Looked at in this way, the black, brown, yellow, and white men whom we have supposed ourselves examining on the quays, are living records of the remote past, every Chinese and Negro bearing in his face evidence of the antiquity of man.

Next, what has language to tell of man's age on the earth? It appears that the distinct languages known number about a thousand. It is clear, however, at the first glance that these did not all spring up separately. There are groups of languages which show such close likeness in their grammars and dictionaries as proves each group to be descended from one ancestral tongue. Such a group is called a family of languages, and one of the best known of such families may be taken as an example of their way of growth. In ancient times Latin

(using the word in a rather wide sense) was the language of Rome and other Italian districts, and with the spread of the Roman empire it was carried far and wide so as to oust the early languages of whole provinces. Undergoing in each land a different course of change, Latin gave rise to the Romance family of languages, of which Italian, Spanish, and French are well-known members. How these languages have come to differ after ages of separate life we judge by seeing that sailors from Dieppe cannot make themselves understood in Malaga, nor does a knowledge of French enable us to read Dante. Yet the Romance languages keep the traces of their Roman origin plainly enough for Italian, Spanish, and French sentences to be taken and every word referred to something near it in classical Latin, which may be roughly treated as the original form. Familiar proverbs are here given as illustrations, with the warning to the reader that the Latin words do not form sentences, but merely show the sources of the modern words which do.

ITALIAN.

E meglio un uovo oggi che una gallina domani.
est melius unum ovum hodie quid una gallina de mane.
i.e. Better is an egg to-day than a hen to-morrow.

Chi va piano va sano, chi va sano va lontano.
qui vadit planum vadit sanum, qui vadit sanum vadit longum.
i.e. He who goes gently goes safe, he who goes safe goes far.

SPANISH.

Quien canta sus males espanta.
quem cantat suos malos expav(ere).
i.e. He who sings frightens away his ills.

Por la calle de despues se va á la casa de nunca.
per illam callem de de-ex-post se vadit ad illam casam de nunquam.
i.e. By the street of by and by one goes to the house of never.

FRENCH.

Un tiens vaut mieux que deux tu l' auras.
unum tene valet melius quod duos tu illum habere-habes.
i.e. One take-it is worth more than two thou-shalt-have-its.

Parler de la corde dans la maison d' un pendu.
parabola de illam chordam de intus illam mansionem de unum pend(o).
i.e. (Never to) talk of a rope in the house of a hanged man.

It is plain on the face of such sentences as these that Italian, Spanish, and French are in fact transformed Latin, their words having been gradually altered as

they descended, generation after generation, from the parent tongue. Now even if Latin were lost, philologists would still be able, by comparing the set of Romance languages, to infer that such a language must have existed to give rise to them all, though no doubt such a reconstruction of Latin would give but a meagre notion, either of its stock of words or its grammatical inflexions. This kind of argument by which a lost parent-language is discovered from the likeness among its descendants, may be well seen in another set of European tongues. Let us suppose ourselves listening to a group of Dutch sailors; at first their talk may seem unintelligible, but after a while a sharp ear will catch the sound of well-known words, and perhaps at last whole sentences like these :—*Kom hier! Ga aan boord! Is de maan op? Hoe is het weder? Niet goed. Het is een hevige storm, en bitter koud nu.* The spelling of these words, different from our mode, disguises their resemblance, but as spoken they come very near corresponding sentences in English, somewhat thus :—*Come here! Go on board! Is the moon up? How is the weather? Not good. It is a heavy storm, and bitter cold now.* Now it stands to reason that no two languages could have come to be so like, unless both were descended from one parent tongue. The argument is really much like that as to the origin of the people themselves. As we say, these Dutch and English are beings so nearly alike that they must have descended from a common stock, so we say, these languages are so alike that they must have been derived from a common language. Dutch and English are accordingly said to be closely related to one another, and the language of Friesland proves on examination to be another near relative. Thence it is inferred that a parent language or group of dialects, which may be called the original Low-Dutch, or Low-German, must once have been spoken, though it is not actually to be found, not happening to have been written down and so preserved.

Now it is easy to see that as ages go on, and the languages of a family each take their separate course of change, it must become less and less possible to show their relationship by comparing whole sentences. Philologists have to depend on less perfect resemblances, but such are sufficient when not only words from the dictionary correspond in the two languages, but also these are worked up into actual speech by corresponding

forms of grammar. Thus when Sanskrit, the ancient language of the Brahmans in India, is compared with Greek and Latin, it appears that the Sanskrit verb *dâ* expresses the idea to give, and makes its present tense by reduplicating and adding a person-affix, so becoming *dadâmi*, nearly as Greek makes *didōmi*; from the same root Sanskrit makes a future participle *dâsyamânas*, corresponding to Greek *dōsomenos*, while Sanskrit *dâtâr* matches Greek *dotēr* = giver. So where Latin has *vox*, *vocis*, *vocem*, *voces*, *vocum*, *vocibus*, Sanskrit has *vâk*, *vâčas*, *vâčam*, *vâčas*, *vâčâm*, *vâgbhyas*. When such thoroughgoing analogy as this is found to run through several languages, as Sanskrit, Greek, and Latin, no other explanation is possible but that an ancient parent language gave rise to them all, they having only varied off from it in different directions. In this way it is shown that not only are these particular languages related by descent, but that groups of ancient and modern languages in Asia and Europe, the Indian group, the Persian group, the Hellenic or Greek group, the Italic or Latin group, the Slavonic group to which Russian belongs, the Teutonic group which English is a member of, the Keltic group which Welsh is a member of, are all descendants of one common ancestral language, which is now theoretically called the Aryan, though practically its nature can be made out only in a vague way by comparing its descendant languages. Some of these have come down to us in forms which are extremely ancient, as antiquity goes in our limited chronology. The sacred books of India and Persia have preserved the Sanskrit and Zend languages, which by their structure show to the eye of the philologist an antiquity beyond that of the earliest Greek and Latin inscriptions and the old Persian cuneiform rock-writing of Darius. But the Aryan languages, even in their oldest known states, had already become so different that it was the greatest feat of modern philology to demonstrate that they had a common origin at all. The faint likeness by which Welsh still shows its relationship to Greek and German may give some idea of the time that may have elapsed since all three were developed off from the original Aryan tongue, which itself probably ceased to exist long before the historical period began.

Among the languages of ancient nations, another great group holds a high place in the world's history. This is the Semitic family, which includes the Hebrew and

Phœnician, and the Assyrian deciphered from the wedge-characters of Nineveh. Arabic, the language of the *Koran*, is the great modern representative of the family, and the closeness with which it matches Hebrew may be shown in familiar phrases. The Arab still salutes the stranger with *salâm alaikum*, "peace upon you," nearly as the ancient Hebrew would have said *shâlôm lâchem*, that is, "peace to you," and the often-heard Arabic exclamation *bismillah* may be turned into Hebrew, as *be-shêm hâ-Elohim*, "in the name of God." So the Hebrew names of persons mentioned in the Bible give the interpretation of many Arabic proper names, as where *Ebed-melech*, "servant of the king," who took Jeremiah out of the dungeon, bore a name nearly like that of the khalif *Abd-el-Melik*, in Mohammedan history. But no one of these Semitic languages has any claim to be the original of the family, standing to the others as Latin does to Italian and French. All of them, Assyrian, Phœnician, Hebrew, Arabic, are sister-languages, pointing back to an earlier parent language which has long disappeared. The ancient Egyptian language of the hieroglyphics cannot be classed as a member of the Semitic family, though it shows points of resemblance which may indicate some remote connexion. There are also known to have existed before 2000 B.C. two important languages not belonging to either the Aryan or Semitic family; these were the ancient Babylonian and the ancient Chinese. As for the languages of more outlying regions of the world, such as America, when they come into view they are found likewise to consist of many separate groups or families.

This slight glimpse of the earliest known state of language in the world is enough to teach the interesting lesson that the main work of language-making was done in the ages before history. Going back as far as philology can take us, we find already existing a number of language-groups, differing in words and structure, and if they ever had any relationship with one another no longer showing it by signs clear enough for our skill to make out. Of an original primitive language of mankind, the most patient research has found no traces. The oldest types of language we can reach by working back from known languages show no signs of being primitive tongues of mankind. Indeed, it may be positively asserted that they are not such, but that ages of growth and decay have mostly obliterated the traces

how each particular sound came to express its particular sense. Man, since the historical period, has done little in the way of absolute new creation of language, for the good reason that his wants were already supplied by the words he learnt from his fathers, and all he had to do when a new idea came to him was to work up old words into some new shape. Thus the study of languages gives much the same view of man's antiquity as has been already gained from the study of races. The philologist, asked how long he thinks mankind to have existed, answers that it must have been long enough for human speech to have grown from its earliest beginnings into elaborate languages, and for these in their turn to have developed into families spread far and wide over the world. This immense work had been already accomplished in ages before the earliest inscriptions of Egypt, Babylon, Assyria, Phœnicia, Persia, Greece, for these show the great families of human speech already in full existence.

Next, we have to look at culture or civilization, to see whether this also shows signs of man having lived and laboured in ages earlier than the earliest which historical records can tell of. For this purpose it is needful to understand what has been the general course of arts, knowledge, and institutions. It is a good old rule to work from the known to the unknown, and all intelligent people have much to tell from their own experience as to how civilization develops. The account which an old man can give of England as he remembers it in his schoolboy days, and of the inventions and improvements he has seen come in since, is in itself a valuable lesson. Thus, when starting from London by express train to reach Edinburgh by dinner-time, he thinks of when it used to be fair coach-travelling to get through in two days and nights. Catching sight of a signal-post on the line, he remembers how such semaphores (that is, sign-bearers) were then the best means of telegraphing, and stood waving their arms on the hills between London and Plymouth, signalling the Admiralty messages. Thinking of the electric telegraph which has superseded them reminds him that this invention arose out of a discovery made in his youth as to the connexion between electricity and magnetism. This again suggests other modern scientific discoveries that have opened to us the secrets of the universe, such as the spectrum-analysis which now makes out with such precision the materials

of the stars which is just what our fathers were quite certain no man on earth ever could know. Our informant can tell us, too, how knowledge has not only increased, but is far more widely spread than formerly, when the thriving farmer's son could hardly get schooling practically so good as the labourer's son is now entitled to of right. He may then go on to explain to his hearers how, since his time, the laws of the land have been improved and better carried out, so that men are no longer hanged for stealing, that more is done to reform the criminal classes instead of merely punishing them, that life and property are safer than in old times. Last, but not least, he can show from his own recollection that people are morally a shade better than they were, that public opinion demands a somewhat higher standard of conduct than in past generations, as may be seen in the sharper disapproval that now falls on cheats and drunkards. From such examples of the progress in civilization that has come in a single country and a single lifetime, it is clear that the world has not been standing still with us, but new arts, new thoughts, new institutions, new rules of life, have arisen or been developed out of the older state of things.

Now this growth or development in civilization, so rapid in our own time, appears to have been going on more or less actively since the early ages of man. Proof of this comes to us in several different ways. History, so far as it reaches back, shows arts, sciences, and political institutions beginning in ruder states, and becoming in the course of ages more intelligent, more systematic, more perfectly arranged or organized to answer their purposes. Not to give many instances of a fact so familiar, the history of parliamentary government begins with the old-world councils of the chiefs and tumultuous assemblies of the whole people. The history of medicine goes back to the times when *epilepsy* or "seizure" (Greek, *epilēpsis*) was thought to be really the act of a demon seizing and convulsing the patient. But our object here is to get beyond such ordinary information of the history books, and to judge what stages civilization passed through in times yet earlier. Here one valuable aid is archæology, which for instance shows us the stone hatchets and other rude instruments which belonged to early tribes of men, thus proving how low their state of arts was; of this more will be said presently. Another useful guide is to be had from survivals in culture.

Looking closely into the thoughts, arts, and habits of any nation, the student finds everywhere the remains of older states of things out of which they arose. To take a trivial example, if we want to know why so quaintly cut a garment as the evening dress-coat is worn, the explanation may be found thus. The cutting away at the waist had once the reasonable purpose of preventing the coat skirts from getting in the way in riding, while the pair of useless buttons behind the waist are also relics from the times when such buttons really served the purpose of fastening these skirts behind; the curiously cut collar keeps the now misplaced notches made to allow of its being worn turned up or down, the smart facings represent the old ordinary lining, and the sham cuffs now made with a seam round the wrist are survivals from real cuffs when the sleeve used to be turned back. Thus it is seen that the present ceremonial dress-coat owes its peculiarities to being descended from the old-fashioned practical coat in which a man rode and worked. Or again, if one looks in modern English life for proof of the Norman Conquest eight centuries ago, one may find it in the "*Oh yes! Oh yes!*" of the town-crier, who all unknowingly keeps up the old French form of proclamation, "*Oyez! Oyez!*" that is, "Hear ye! Hear ye!" To what yet more distant periods of civilization such survivals may reach back is well seen in an example from India. There, though people have for ages kindled fire for practical use with the flint and steel, yet the Brahmans, to make the sacred fire for the daily sacrifice, still use the barbaric art of violently boring a pointed stick into another piece of wood till a spark comes. Asked why they thus waste their labour when they know better, they answer that they do it to get pure and holy fire. But to us it is plain that they are really keeping up by unchanging custom a remnant of the ruder life once led by their remote ancestors. On the whole, these various ways of examining arts and sciences all prove that they never spring forth perfect, like Athene out of the split head of Zeus. They come on by successive steps, and, where other information fails, the observer may often trust himself to judge from the mere look of an invention how it probably arose. Thus no one can look at a cross-bow and a common long-bow without being convinced that the long-bow was the earlier, and that the cross-bow was made afterwards by fitting a common bow on a stock, and arranging a trigger

to let go the string after taking aim. Though history fails to tell us who did this and when, we feel almost as sure of it as of the known historical facts that the match-lock led up to the wheel-lock, and that again to the flint-lock musket, and that again to the percussion musket, and that again to the breech-loading rifle.

Putting these various means of information together, it often becomes possible to picture the whole course of an art or an institution, tracing it back from its highest state in the civilized world till we reach its beginnings in the life of the rudest tribes of men. For instance, let us look at a course of modern mathematics, as represented in the books taken for university honours. A student living in Queen Elizabeth's time would have had no infinitesimal calculus to study, hardly even algebraic geometry, for what is now called the higher mathematics was invented since then. Going back into the Middle Ages, we come to the time when algebra had been just brought in, a novelty due to the Hindu mathematicians and their scholars, the Arabs; and next we find the numeral ciphers, 0, 1, 2, 3, &c., beginning to be known as an improvement on the old calculating board and the Roman I, II, III. In the classic ages yet earlier, we reach the time when the methods of Euklid and the other Greek geometers first appeared. So we get back to what was known to the mathematicians of the earliest historical period in Babylonia and Egypt, an arithmetic clumsily doing what children in the lower standards are taught with us to do far more neatly, and a rough geometry consisting of a few rules of practical mensuration. This is as far as history can go toward the beginnings of mathematics, but there are other means of discovering through what lower stages the science arose. The very names still used to denote lengths, such as cubit, hand, foot, span, nail, show how the art of mensuration had its origin in times when standard measures had not yet been invented, but men put their hands and feet alongside objects of which they wished to estimate the size. So there is abundant evidence that arithmetic came up from counting on the fingers and toes, such as may still be seen among savages. Words still used for numbers in many languages were evidently made during the period when such reckoning on the hands and feet was usual, and they have lasted on ever since. Thus a Malay expresses five by the word *lima*, which (though he does not know it) once meant " hand," so that it is seen

to be a survival from ages when his ancestors, wanting a word for five, held up one hand and said "hand." Indeed, the reason of our own decimal notation, why we reckon by tens instead of the more convenient twelves, appears to be that our forefathers got from their own fingers the habit of counting by tens which has been since kept up, an unchanged relic of primitive man. The following chapters contain many other cases of such growth of arts from the simplest origins. Thus, in examining tools, it will be seen how the rudely chipped stone grasped in the hand to hack with, led up to the more artificially shaped stone chisel fitted as a hatchet in a wooden handle, how afterwards when metal came in here was substituted for the stone a bronze or iron blade, till at last was reached the most perfect modern foresters' axe, with its steel blade socketed to take the well-balanced handle. Specimens such as those in Chapter VIII show these great moves in the development of the axe, which began before chronology and history, and has been from the first one of man's chief aids in civilizing himself.

It does not follow from such arguments as these that civilization is always on the move, or that its movement is always progress. On the contrary, history teaches that it remains stationary for long periods, and often falls back. To understand such decline of culture, it must be borne in mind that the highest arts and the most elaborate arrangements of society do not always prevail, in fact they may be too perfect to hold their ground, for people must have what fits with their circumstances. There is an instructive lesson to be learnt from a remark made by an Englishman at Singapore, who noticed with surprise two curious trades flourishing there. One was to buy old English-built ships, cut them down and rig them as junks; the other was to buy English percussion muskets and turn them into old-fashioned flintlocks. At first sight this looks like mere stupidity, but on consideration it is seen to be reasonable enough. It was so difficult to get Eastern sailors to work ships of European rig that it answered better to provide them with the clumsier craft they were used to; and as for the guns, the hunters far away in the hot, damp forests were better off with gunflints than if they had to carry and keep dry a stock of caps. In both cases, what they wanted was not the highest product of civilization, but something suited to the situation and

easiest to be had. Now the same rule applies both to taking in new civilization and keeping up old. When the life of a people is altered by emigration into a new country, or by war and distress at home, or mixture with a lower race, the culture of their forefathers may be no longer needed or possible, and so dwindles away. Such degeneration is to be seen among the descendants of Portuguese in the East Indies, who have intermarried with the natives and fallen out of the march of civilization, so that newly-arrived Europeans go to look at them lounging about their mean hovels in the midst of luxuriant tropical fruits and flowers, as if they had been set there to teach by example how man falls in culture where the need of effort is wanting. Another frequent cause of loss of civilization is when people once more prosperous are ruined or driven from their homes, like those Shoshonee Indians who have taken refuge from their enemies, the Blackfeet, in the wilds of the Rocky Mountains, where they now roam, called Digger Indians from the wild roots they dig for as part of their miserable subsistence. Not only the degraded state of such outcasts, but the loss of particular arts by other peoples, may often be explained by loss of culture under unfavourable conditions. For instance, the South Sea Islanders, though not a very rude people, when visited by Captain Cook used only stone hatchets and knives, being indeed so ignorant of metal that they planted the first iron nails they got from the English sailors, in the hope of raising a new crop. Possibly their ancestors never had metals, but it seems as likely that these ancestors were an Asiatic people to whom metal was known, but who, through emigration to ocean islands and separation from their kinsfolk, lost the use of it and fell back into the stone age. It is necessary for the student to be alive to the importance of decline in civilization, but it is here more particularly mentioned in order to point out that it in no way contradicts the theory that civilization itself is developed from low to high stages. One cannot lose a thing without having had it first, and wherever tribes are fallen from the higher civilization of their ancestors, this only leaves it to be accounted for how that higher civilization grew up.

On the whole it appears that wherever there are found elaborate arts, abstruse knowledge, complex institutions, these are results of gradual development from an earlier, simpler, and ruder state of life. No stage of civilization

comes into existence spontaneously, but grows or is developed out of the stage before it. This is the great principle which every scholar must lay firm hold of, if he intends to understand either the world he lives in or the history of the past. Let us now see how this bears on the antiquity and early condition of mankind. The monuments of Egypt and Babylonia show that toward 6000 years ago certain nations had already come to an advanced state of culture. No doubt the greater part of the earth was then peopled by barbarians and savages, as it remained afterwards. But in the regions of the Nile and the Euphrates there was civilization. The ancient Egyptians had that greatest mark of a civilized nation, the art of writing; indeed the hieroglyphic characters of their inscriptions appear to have been the origin of our alphabet. They were a nation skilled in agriculture, raising from their fields fertilized by the yearly inundation those rich crops of grain that provided subsistence for the dense population. How numerous and how skilled in constructive art the ancient Egyptians were is seen by every traveller who looks on the pyramids which have made their name famous through all history. The great pyramid of Gizeh still ranks among the wonders of the world, a mountain of hewn limestone and syenite, whose size Londoners describe by saying that it stands on a square the size of Lincoln's-Inn-Fields, and rises above the height of St. Paul's. The perfection of its huge blocks and the beautiful masonry of the inner chambers and passages show the skill not only of the stonecutter but of the practical geometer. The setting of the sides to the cardinal points is so exact as to prove that the Egyptians were excellent observers of the elementary facts of astronomy; the day of the equinox can be taken by observing the sunset across the face of the pyramid, and the neighbouring Arabs still adjust their astronomical dates by its shadow. As far back as anything is known of them, the Egyptians appear to have worked in copper and iron, as well as gold and silver. So their arts and habits, their sculpture and carpentry, their reckoning and measuring, their system of official life with its governors and scribes, their religion with its orders of priesthood and its continual ceremonies, all appear the results of long and gradual growth. What, perhaps, gives the highest idea of antiquity is to look at very early monuments, such as the tomb of prince Teta of the 4th dynasty in the British

Museum, and notice how Egyptian culture had even then begun to grow stiff and traditional. Art was already reaching the stage when it seemed to men that no more progress was possible, for their ancestors had laid down the perfect rule of life, which it was sin to alter by way of reform. Of the early Babylonians or Chaldæans less is known, yet their monuments and inscriptions show how ancient and how high was their civilization. Their writing was in cuneiform or wedge-shaped characters, of which they seem to have been the inventors, and which their successors, the Assyrians, learnt from them. They were great builders of cities, and the bricks inscribed with their kings' names remain as records of their great temples, such, for instance, as that dedicated to the god of Ur, at the city known to Biblical history as Ur of the Chaldees. Written copies of their laws exist, so advanced as to have provisions as to the property of married women, the imprisonment of a father or mother for denying their son, the daily fine of a half-measure of corn levied on the master who killed or ill-used his slaves. Their astrology, which made the names of Chaldæan and Babylonian famous ever since, led them to make those regular observations of the heavenly bodies which gave rise to the science of astronomy. The nation which wrote its name thus largely in the book of civilization dates back into the same period of high antiquity as the Egyptian. These, then, are the two nations whose culture is earliest vouched for by inscriptions done at the very time of their ancient grandeur, and therefore it is safer to appeal to them than to other nations which can only show as proofs of their antiquity writings drawn up in far later ages. Looking at their ancient civilization, it seems to have been formed by men whose minds worked much like our own. No superhuman powers were required for the work, but just human nature groping on by roundabout ways, reaching great results, yet not half knowing how to profit by them when reached; solving the great problem of writing, yet not seeing how to simplify the clumsy hieroglyphics into letters; devoting earnest thought to religion and yet keeping up a dog and cat worship which was a jest even to the ancients; cultivating astronomy and yet remaining mazed in the follies of astrology. In the midst of their most striking efforts of civilization, the traces may be discerned of the barbaric condition which prevailed before; the Egyptian pyramids are burial-mounds like

those of prehistoric England, but huge in size and built of hewn stone or brick; the Egyptian hieroglyphics, with their pictures of men and beasts and miscellaneous things, tell the story of their own invention, how they began as a mere picture-writing like that of the rude hunters of America. Thus it appears that civilization, at the earliest dates where history brings it into view, had already reached a level which can only be accounted for by growth during a long prehistoric period. This result agrees with the conclusions already arrived at by the study of races and language.

Without attempting here to draw a picture of life as it may have been among men at their first appearance on the earth, it is important to go back as far as such evidence of the progress of civilization may fairly lead us. In judging how mankind may have once lived, it is also a great help to observe how they are actually found living. Human life may be roughly classed into three great stages, Savage, Barbaric, Civilized, which may be defined as follows. The lowest or *savage* state is that in which man subsists on wild plants and animals, neither tilling the soil nor domesticating creatures for his food. Savages may dwell in tropical forests where the abundant fruit and game may allow small clans to live in one spot and find a living all the year round, while in barer and colder regions they have to lead a wandering life in quest of the wild food which they soon exhaust in any place. In making their rude implements, the materials used by savages are what they find ready to hand, such as wood, stone, and bone, but they cannot extract metal from ore, and therefore belong to the Stone Age. Men may be considered to have risen into the next or *barbaric* state when they take to agriculture. With the certain supply of food which can be stored till next harvest, settled village and town life is established, with immense results in the improvement of arts, knowledge, manners, and government. Pastoral tribes are to be reckoned in the barbaric stage, for though their life of shifting camp from pasture to pasture may prevent settled habitation and agriculture, they have from their herds a constant supply of milk and meat. Some barbaric nations have not come beyond using stone implements, but most have risen into the Metal Age. Lastly, *civilized* life may be taken as beginning with the art of writing, which, by recording history, law, knowledge, and religion for the service of ages to come, binds

together the past and the future in an unbroken chain of intellectual and moral progress. This classification of three great stages of culture is practically convenient, and has the advantage of not describing imaginary states of society, but such as are actually known to exist. So far as the evidence goes, it seems that civilization has actually grown up in the world through these three stages, so that to look at a savage of the Brazilian forests, a barbarous New Zealander or Dahoman, and a civilized European, may be the student's best guide to understanding the progress of civilization, only he must be cautioned that the comparison is but a guide, not a full explanation.

In this way it is reasonably inferred that even in countries now civilized, savage and low barbaric tribes must have once lived. Fortunately it is not left altogether to the imagination to picture the live of these rude and ancient men, for many relics of them are found which may be seen and handled in museums. It has now to be considered what sort of evidence of man's age is thus to be had from archæology and geology, and what it proves.

When an antiquary examines the objects dug up in any place, he can generally judge in what state of civilization its inhabitants have been. Thus if there are found weapons of bronze or iron, bits of fine pottery, bones of domestic cattle, charred corn and scraps of cloth, this would be proof that people lived there in a civilized, or at least a high barbaric condition. If there are only rude implements of stone and bone, but no metal, no earthenware, no remains to show that the land was tilled or cattle kept, this would be evidence that the country had been inhabited by some savage tribe. One of the chief questions to be asked about the condition of any people is whether they have metal in use for their tools and weapons. If so, they may be said to be in the metal age. If they have no copper or iron, but make their hatchets, knives, spear-heads, and other cutting and piercing instruments of stone, they are said to be in the stone age. Wherever such stone implements are picked up, as they often are in our own ploughed fields, they prove that stone-age men have once dwelt in the land. It is an important fact that in every region of the inhabited world ancient stone implements are thus found in the ground, showing that at some time the inhabitants were in this respect like the

modern savages. In countries where the people have long been metal-workers, they have often lost all memory of what these stone things are, and tell fanciful stories to account for their being met with in ploughing or digging. One favourite notion, in England and elsewhere, is that the stone hatchets are " thunderbolts " fallen from the sky with the lightning flash. It has been imagined that in the East, the seat of the most ancient civilizations, some district might be found without any traces of man having lived there in a state of early rudeness, so that in this part of the world he might have been civilized from the first. But it is not so. In Assyria, Palestine, Egypt, as in other lands, one may find sharp-chipped flints which show that here also tribes in the stone age once lived, before the use of metal brought in higher civilization.

Whether it may be considered or not that Europe was a quarter of the globe inhabited by the earliest tribes of men, it so happens that remains found in Europe furnish at present the best proofs of man's antiquity. To understand these, it must be explained that the stone age had an earlier and a later period, as may be plainly seen in looking at a good collection of stone implements. Fig. 1 is intended to give some idea of those in use in the later stone age. The hatchet is neatly shaped and edged by rubbing on a grinding-stone, as is also the hammer-head. The spear and arrows, scraper, and flake-knife it would have been waste of labour to grind, but they are chipped out with much skill. On the whole, these stone implements are much like those which the North American Indians have been using to our own day. The question is how long ago tribes who made such stone implements were living in Europe. As to this, we may fairly judge from the position in which they are found in Denmark. The forests of that country are mainly of beeches, but in the peat-mosses lie innumerable trunks of oaks, which show that at an earlier period oak-forests prevailed, and deeper still there lie trunks of pine trees, which show that there were pine-forests still older than the oak-forests. Thus there have been three successive forest-periods, the beech, the oak, and the pine, and the depth of the peat-mosses, which in places is as much as thirty feet, shows that the period of the pine trees was thousands of years ago. While the forests have been changing, the condition of the people living among them has changed also. The modern

woodman cuts down the beech-trees with his iron axe, but among the oak-trunks in the peat are found bronze swords and shield-bosses, which show that the inhabitants of the country were then in the bronze age, and lastly, a flint hatchet taken out from where it lay still lower in the peat beneath the pine-trunks, proves that stone-age men in Denmark lived in the pine-forest period, which carries them back to high antiquity. In England, the tribes who have left such stone implements were in the land before the invasion of that Keltic race whom we call the ancient Britons, and who no doubt came armed with weapons of metal. The stone hatchet-blades and arrow-heads of the older population lie scat-

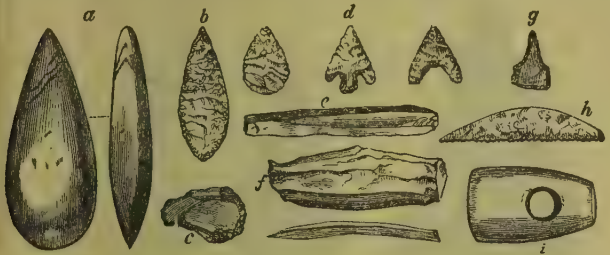


FIG. 1.—Later Stone Age (neolithic) implements. *a*, stone celt or hatchet; *b*, flint spear-head; *c*, scraper; *d*, arrow-heads; *e*, flint flake-knives; *f*, core from which flint-flakes taken off; *g*, flint-awl; *h*, flint saw; *i*, stone hammer-head.

tered over our country, hill and dale, moor and fen, near the surface of the ground, or deeper underground in peat-mosses, or beds of mud and silt. Such bogs or mud-flats began at a date which chronologists would call ancient. But they are what geologists, accustomed to vaster periods of time, consider modern. They belong to the newer alluvial deposits, that is, they were formed within the times when the lie of the land and the flow of the streams were much as they are now. To get an idea of this, one has only to look down from a hillside into a wide valley below, and notice how its flat flooring of mud and sand, stretching right across, must have been laid down by flood-waters following very much their present course along the main stream and down the side slopes. The people of the newer stone age, whose implements are seen in Fig. 1, lived within this historic-

ally ancient, but geologically modern, period, and relics of them are found only in places where man or nature could then have placed them.

But there had been a still earlier period of the stone age, when yet ruder tribes of men lived in our parts of the world, when the climate and the face of the country were strangely different from the present state of things. On the slopes of river valleys such as that of the Ouse, in England, and the Somme, in France, 50 or 100 feet above the present river-banks, and thus altogether out of the reach of any flood now, there are beds of so-called drift gravel. Out of these beds have been dug numerous rude implements of flint, chipped into shape by the hands

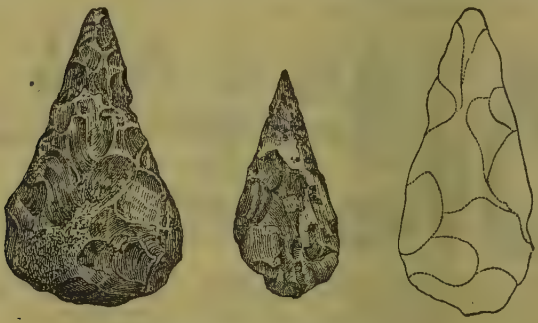


FIG. 2.—Earlier Stone Age (palæolithic) flint picks or hatchets.

of men who had gained no mean dexterity in the art, as any one will find who will try his hand at making one, with any tools he thinks fit. The most remarkable implements of this earlier stone age are the picks or hatchets shown in Fig. 2. The coarseness of their finish, and the absence of any signs of grinding, even at the edges of hacking or cutting instruments, show that the makers had not come nearly to the skill of the later stone age. It is usual to distinguish the two kinds of implements, and the periods they belong to, by the terms introduced by Sir J. Lubbock, palæolithic and neolithic, that is "old-stone" and "new-stone." Looking now at the high gravel-beds in which palæolithic implements such as those shown in Fig. 2 occur, it is evident from their position that they had nothing to do with the

water-action which is now laying down and shifting sand-banks and mud-flats at the bottom of the valleys, nor with the present rain-wash which scours the surface of the hillsides. They must have been deposited in a former period when the condition of land and water was different from what it is now. How far this state of things was due to the valleys not being yet cut out to near their present depth, to the whole country lying lower above the sea-level, or to the rivers being vastly larger than at present from the heavier rainfall of a pluvial period, it would be raising too intricate geological questions to discuss here. Geology shows the old drift-gravels to belong to times when the glacial or icy period with its arctic climate was passing, or had passed away, in Europe. From the bones and teeth found with the flint implements in the gravel-beds, it is known what animals inhabited the land at the same time with the men of the old stone age. The mammoth, or huge woolly elephant, and several kinds of rhinoceros, also extinct, browsed on the branches of the forest trees, and a species of hippopotamus much like that at present living frequented the rivers. The musk-ox and the grizzly bear, which England harboured in this remote period, may still be hunted in the Rocky Mountains, but the ancient cave-bear, which was one of the dangerous wild beasts of our land, is no longer on the face of the earth. The British lion was of a larger breed than those now in Asia and Africa, and perhaps than those which Herodotus mentions as prowling in Macedonia in the fifth century B.C., and falling on the camels of Xerxes' army. To judge by such signs as the presence of the reindeer, and the mammoth with its hairy coat, the climate of Europe was severer than now, perhaps like that of Siberia. How long man had been in the land there is no clear evidence. For all we know, he may have lasted on from an earlier and more genial period, or he may have only lately migrated into Europe from some warmer region. Implements like his are not unknown in Asia, as where in Southern India, above Madras, there lies at the foot of the Eastern Ghâts a terrace of irony clay or laterite, containing stone implements of very similar make to those of the drift-men in Europe.

These European savages of the mammoth-period resorted much to shelter at the foot of overhanging cliffs, and to caverns such as Kent's Hole near Torquay, where

the implements of the men and the bones of the beasts are found together in abundance. In Central France especially, the examination of such bone-caves has brought to light evidence of the whole way of life of a group of ancient tribes. The reindeer, which have now retreated to high northern latitudes, were then plentiful in France, as appears from their bones and antlers imbedded with remains of the mammoth under the stalagmite floors of the caves of Perigord. With them are found rude stone hatchets and scrapers, pounding-stones, bone spear-heads, awls, arrow-straighteners, and other objects belonging to a life like that of the modern Esquimaux who hunt the reindeer on the coasts of Hudson's Bay. Like the Esquimaux also, these early French and Swiss savages spent their leisure time in

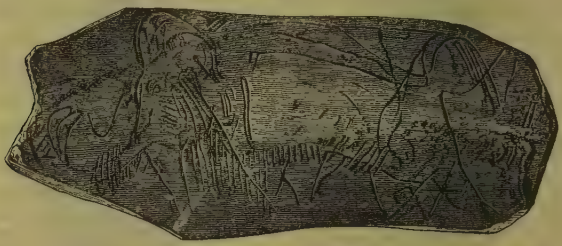


FIG. 3.—Sketch of mammoth from cave of La Madeleine (Lartet and Christy

carving figures of animals. Among many such figures found in the French caves is a mammoth, Fig. 3, scratched on a piece of its own ivory, so as to touch off neatly the shaggy hair and huge curved tusks which distinguish the mammoth from other species of elephant. There has been also found a rude representation of a man, Fig. 4, grouped with two horses' heads and a snake or eel; this is interesting as being the most ancient human portrait known.

Thus it appears that man of the older stone age was already living when such a river as the Thames flowed at a height approaching a hundred feet above the level of its present bed, and when the climate was of that Lapland kind suited to the woolly mammoth and the reindeer, and the rest of the un-English looking group of animals now perished out of this region, or extinct altogether. From all that is known of the slowness

with which such alterations take place anywhere in the lie of the land, the climate, and the wild animals, we cannot suppose changes so vast to have happened without a long lapse of time before the newer stone age came in, when the streams had settled down to near their present levels, and the climate and the wild creatures had become much as they were within the historical period. It is also plain from the actual remains found that these most ancient known tribes were wild hunters and fishers, such as we should now class as savages. It is best, however, not to apply to them the term primitive men, as this might be understood to mean that they were the first men who appeared on earth, or at least like them. The life the men of the mammoth-period must have led at Abbeville or Torquay shows on the face of it reasons against its being man's primitive

FIG. 4.—Sketch of man and horses from cave (Lartet and Christy).

life. These old stone-age men are more likely to have been tribes whose ancestors while living under a milder climate gained some rude skill in the arts of procuring food and defending themselves, so that afterwards they were able by a hard struggle to hold their own against the harsh weather and fierce beasts of the quaternary period.

How long ago this period was, no certain knowledge is yet to be had. Some geologists have suggested twenty thousand years, while others say a hundred thousand or more, but these are guesses made where there is no scale to reckon time by. It is safest to be content at present to regard it as a geological period lying back out of the range of chronology. It is thought by several eminent geologists that stones shaped by man, and therefore proving his presence, occur in England and France in beds deposited before the last glacial period, when much of the continent lay submerged under an icy sea, where drifting icebergs dropped on what is now dry land their

huge boulders of rock transported from distant mountains. This cannot be taken as proved, but if true it would immensely increase our estimate of man's age. At any rate the conclusive proofs of man's existence during the quaternary or mammoth period do not even bring us into view of the remoter time when human life first began on earth. Thus geology establishes a principle which lies at the very foundation of the science of anthropology. Until of late, while it used to be reckoned by chronologists that the earth and man were less than 6000 years old, the science of geology could hardly exist, there being no room for its long processes of building up the strata containing the remains of its vast successions of plants and animals. These are now accounted for on the theory that geological time extends over millions of years. It is true that man reaches back comparatively little way into this immense lapse of time. Yet his first appearance on earth goes back to an age compared with which the ancients, as we call them, are but moderns. The few thousand years of recorded history only take us back to a præhistoric period of untold length, during which took place the primary distribution of mankind over the earth and the development of the great races, the formation of speech and the settlement of the great families of language, and the growth of culture up to the levels of the old world nations of the East, the forerunners and founders of modern civilized life.

Having now sketched what history, archæology, and geology teach as to man's age and course on the earth, we shall proceed in the following chapters to describe more fully Man and his varieties as they appear in natural history, next examining the nature and growth of Language, and afterwards the development of the knowledge, arts, and institutions, which make up Civilization.

CHAPTER II

MAN AND OTHER ANIMALS

Vertebrate Animals, 27—Succession and Descent of Species, 28—Apes and Man, comparison of structure, 29—Hands and Feet, 32—Hair, 34—Features, 34—Brain, 35—Mind in Lower Animals and Man, 35.

To understand rightly the construction of the human body, and to compare our own limbs and organs with those of other animals, requires a thorough knowledge of anatomy and physiology. It will not be attempted here to draw up an abstract of these sciences, for which such handbooks should be studied as Huxley's *Elementary Physiology* and Mivart's *Elementary Anatomy*. But it will be useful to give a slight outline of the evidence as to man's place in the animal world, which may be done without requiring special knowledge in the reader.

That the bodies of other animals more or less correspond in structure to our own is one of the lessons we begin to learn in the nursery. Boys playing at horses, one on all-fours and the other astride on his back, have already some notion how the imagined horse matches a real one as to head, eyes, and ears, mouth and teeth, back and legs. If one questions a country lad sitting on a stile watching the hunters go by, he knows well enough that the huntsman and his horse, the hounds and the hare they are chasing, are all creatures built up on the same kind of bony scaffolding or skeleton, that their life is carried on by means of similar organs, lungs to breathe with, a stomach to digest the food taken in by the mouth and gullet, a heart to drive the blood through the vessels, while the eyes, ears, and nostrils receive in them all in like manner the impressions of sight, hearing, and smell. Very likely the peasant has taken all this as a matter of course without ever reflecting on it, and even more educated people are apt to do the same. Had it come as a new discovery, it would have set any intelligent mind thinking what must be the tie

or connexion between creatures thus formed as it were on one original pattern, only varied in different modes for different ends. The scientific comparison of animals, even when made in the most elementary way, does at once bring this great problem before our minds. In some cases, more exact knowledge shows that the first rough comparison of man and beast may want correction. For instance, when a man's skeleton and a horse's are set side by side, it becomes plain that the horse's knee and hock do not answer, as is popularly supposed, to our elbow and knee, but to our wrist and ankle. The examination of the man's limb and the horse's leads to a further and remarkable conclusion, that the horse's fore- and hind-leg really correspond to a man's arm and leg in which all the fingers and toes should have become useless and shrunk away, except one finger and one toe, which are left to be walked upon, with the nail become a hoof. The general law to be learnt from the series of skeletons in a natural history museum is that through order after order of fishes, reptiles, birds, beasts, up to man himself, a common type or pattern may be traced, belonging to all animals which are vertebrate, that is, which have a backbone. Limbs may still be recognized though their shape and service have changed, and though they may even have dwindled into remnants, as if left not for use, but to keep up the old model. Thus, although a perch's skeleton differs so much from a man's, its pectoral and ventral fins still correspond to arms and legs. Snakes are mostly limbless, yet there are forms which connect them with the quadrupeds, as, for instance, the boa-constrictor's skeleton shows a pair of rudimentary hind-legs. The Greenland whale has no visible hind-limbs, and its fore-limbs are paddles or flippers, yet, when dissected, the skeleton shows not only remnants of what in man would be the leg-bones, but the flipper actually has within it the set of bones which belong to the human arm and hand. It is popularly considered that man is especially distinguished from the lower animals by not having a tail; yet the tail is plainly to be seen in the human skeleton, represented by the last tapering vertebræ of the spine.

All these are animals now living. But geology shows that in long-past ages the earth has been inhabited by species different from those at present existing, and yet evidently related to them. In the tertiary period Australia was distinguished as now by its marsupial or

pouched animals, but these were not of any present species, and mostly far larger; even the tallest kangaroo now to be seen is a puny creature in comparison with the enormous extinct diprotodon, whose skull was three feet long. So in South America there lived huge edentate animals, now poorly represented by the sloths, anteaters and armadillos, to be seen in our Zoological Gardens. Elephants are found fossil in the miocene deposits, but the species were all different from those in Africa and India now. These are common examples of the great principle now received by all zoologists, that from remote geological antiquity there have from time to time appeared on earth new species of animals, so far similar to those which came before them as to look as if the old types had been altered to fit new conditions of life, the earlier forms then tending to die out and disappear. This relation between the older species of vertebrate animals and the newer species which have supplanted them is a matter of actual observation, and beyond dispute. Many zoologists, now perhaps the majority, go a step farther than this, not only acknowledging that there is a relation between the new species and the old, but seeking to explain it by the hypothesis of descent or development, now often called, from its great modern expounder, the Darwinian theory. The formation of breeds or varieties of animals being an admitted fact, it is argued that natural variation under changed conditions of life can go far enough to produce new species, which by better adaptation to climate and circumstances may supplant the old. On this theory, the present kangaroos of Australia, sloths of South America, and elephants of India, are not only the successors but the actual descendants of extinct ones, and the fossil bones of tertiary horse-like animals with three-toed and four-toed feet show what the remote ancestors of our horses were like, in ages before the unused toes dwindled to the splint-bones which represent them in the horse's leg now. According to the doctrine of descent, when several species of animals living at the same time show close resemblance in structure, it is inferred that this resemblance must have been inherited by all from one ancestral species. Now of all the mammalia, or animals which suckle their young, those whose structure brings them closest to man are the apes or monkeys, and among these the catarhine or near-nostrilled apes of the Old World, and among these the group called anthropoid or manlike,

which inhabit tropical forests from Africa to the Eastern Archipelago. By now comparing their skeletons, it will be seen that in any scale of nature or scheme of creation these animals must be placed in somewhat close relation to man. No competent anatomist who has examined the bodily structure of these apes considers it possible that man can be descended from any of them, but according to the doctrine of descent they appear as the nearest existing offshoots from the same primitive stock whence man also came.

Professor Huxley's *Man's Place in Nature*, in which this anatomical comparison is made, contains a celebrated drawing which is copied in Fig. 5 as the readiest means of showing how the anthropoid apes correspond bone for bone with ourselves. At the same time it illustrates some main points in which their bodily actions are unlike ours. It has been said that the child first takes on him the dignity of man when he leaves off going on all-fours. But in fact, standing and walking upright is not a mere matter of training; it belongs to the arrangement of the human body being different from that of quadrupeds. The limbs of the dog or cow are so proportioned as to bring them down on all-fours, and this is to a less degree the case with the apes, while the head and trunk of the growing child are lifted toward the erect attitude by the disproportionate growth of the lower limbs. Though man's standing upright requires continued muscular effort, he is so built as to keep his balance more readily than other animals in this position. It may be noticed from the figure how in man the opening at the base of the skull (occipital foramen) through which the spinal cord passes up into the brain, is farther to the front than in the apes, so that his skull, instead of pitching forward, is balanced on the top of the atlas vertebra (so called from Atlas supporting the globe). The figure shows also the S-like curvature of man's spine, and how the bony pelvis or basin forms a broad support for his intestines as he stands upright, in which attitude the feet serve as bases enabling the legs to carry the trunk. Thus the erect posture, only imitated with difficult effort by the showman's performing animals, is to man easy and unconstrained. Not through great differences of structure, but by adjustments of bones and muscles, the fore- and hind-limbs of quadrupeds work in accord, while in man, whose muscular adaptation is for going on his legs, there is no such reciprocal

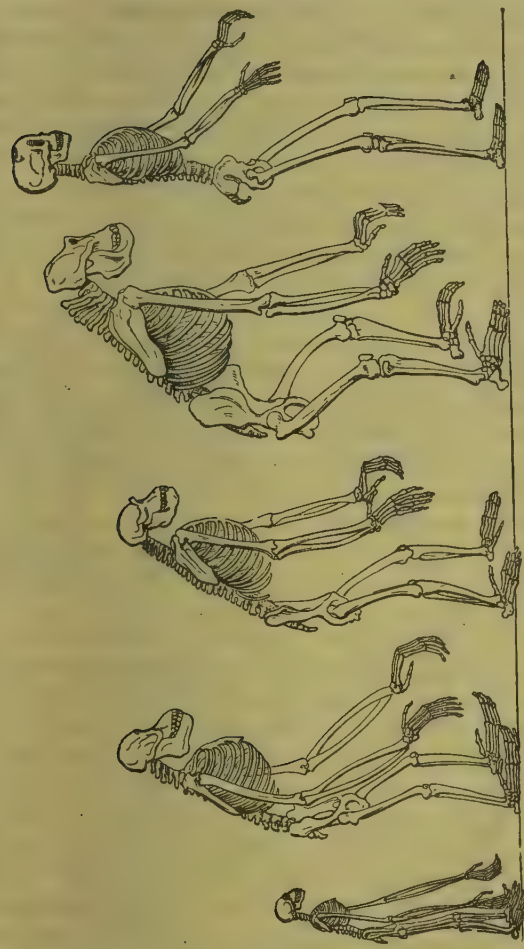


FIG. 5.—Skeletons of apes and man. *a*, gibbon; *b*, orang; *c*, chimpanzee; *d*, gorilla; *e*, man (after Huxley).

action between the legs and arms. Of the monkey tribes, many walk fairly on all-fours as quadrupeds, with legs bent, arms straightened forward, soles and palms touching the ground. But the higher man-like apes are adapted by their structure for a climbing life among the trees, whose branches they grasp with feet and hands. When the orang-utan takes to the ground he shambles clumsily along, generally putting down the outer edge of the feet and the bent knuckles of the hands. The orang and gorilla have the curious habit of resting on their bent fists, so as to draw their bodies forward between their long arms, like a cripple between his crutches. The nearest approach that apes naturally make to the erect attitude, is where the gibbon will go along on its feet, touching the ground with its knuckles first on one side and then on the other, or will run some distance with its arms thrown back above its head to keep the balance, or when the gorilla will rise on its legs and rush forward to attack. All these modes of locomotion may be understood from the skeletons in the figure. The apes thus present interesting intermediate stages between quadruped and biped. But only man is so formed that, using his feet to carry him, he has his hands free for their special work.

In comparing man with the lower animals, it is wrong to set down his pre-eminence entirely to his mind, without noticing the superiority of his limbs as instruments for practical arts. If one looks at the illustrations to "Reynard the Fox," where the artist does his best to represent the lion holding a sceptre, the she-wolf flirting a fan, or the fox writing a letter; what he really shows is, how ill adapted the limbs of quadrupeds are to such actions. Man's being the "tool-using animal" is due to his having hands to use the tool as well as mind to invent it; and only the apes, as most nearly approaching man in their limbs, can fairly imitate the use of such instruments as a spoon or a knife. In Fig. 6 the hand and foot of the chimpanzee may be compared with those of man. Here the ape's foot, *b*, looks so like a hand, that many naturalists have classed the higher apes under the name of four-handed animals, of *quadrumana*. In anatomical structure it is a foot, but it is a prehensile or grasping foot, able to clip or pinch an object by setting the great toe thumb-wise against the others, which the human foot, *d*, cannot do. It is true that among people who go barefoot the great toe is not quite so helpless as

that of a boot-wearing European. With the naked foot the savage Australian picks up his spear, and the Hindu tailor holds his cloth as he squats sewing. The drawing below is purposely taken, not from the free foot of the savage, but from the European foot cramped by the stiff leather boot, because this shows in the utmost way the contrast between ape and man. In the ape, it is seen that both the hands and feet gain their suitability for a tree-climbing life at the loss of their suitability for walking on the ground. But man's upper and lower extremities have become differentiated or specialized in two opposite ways, the human foot becoming a stepping-machine with less grasping-power than the ape-foot, while the human hand comes to excel the ape-hand as a

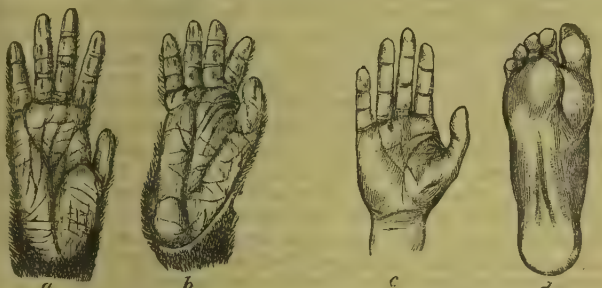


FIG. 6.—*a*, hand, *b*, foot, of chimpanzee (after Vogt); *c*, hand, *d*, foot, of man.

special organ for feeling, holding, and handling. The figure *c* shows the longer and freely-acting thumb and the wider flexible palm in man, the sensitive cushions at our finger-ends also giving us greater delicacy of touch. It is most instructive to visit the monkey-house at the Zoological Gardens for the purpose of comparing hands of high and low kinds. The hand of the marmoset with its five claw-nailed digits is a mere grasping instrument hardly capable of handling. Other low monkeys have the thumbs small and not opposable, that is, their ends do not meet those of the other fingers, whereas the thumbs of the higher apes are (as the figure shows) opposable like ours. How far the value of the hand as a mechanical instrument depends on this opposability, any one may satisfy himself by using his hand with the thumb stiff. It is plain that man's hand, enabling him

to shape and wield weapons and tools to subdue nature to his own ends, is one cause of his standing first among animals. It is not so obvious, but it is true, that his intellectual development must have been in no small degree gained by the use of his hands. From handling objects, putting them in different positions, and setting them side by side, he was led to those simplest kinds of comparing and measuring which are the first elements of exact knowledge, or science.

Outwardly, the shaggy hair of the apes contrasts with the comparative nakedness of the human skin. In man as in lower animals, the thatch of hair indeed forms an effective shelter to the head. The hairy fringe round the human mouth in the adult male has in some races a strong growth, as in the European or the native of Australia. But in others, as in the African negro and the so-called American Indian, the scanty face-hair looks as though it had dwindled to the mere remnant of a fuller growth. Looked at in this way, the hairy patches on the Englishman's breast and limbs, though practically of no importance, are an object of curious interest to the naturalists, who consider them relics from the remote period when man's ancestral stock had a fuller hairy covering, whose want is now supplied by artificial shelter suited to season and climate. It is interesting to notice that there are some few human beings to be met with whose faces and bodies are largely covered with long shaggy hair. Such a face-covering hides the play of feature—that expressive means of intercourse between mind and mind. Had the skeletons of apes and man in our figure been clothed with flesh, we should have seen plainly the signs of man's higher organization in the flexible versatile features, in whose movements and folds are symbolized the pleasures and pains, the loves and hates, of every phase of human life. How coarse and clumsy are the corresponding changes of face in the monkey-tribes, such as the drawing back of the corners of the mouth and wrinkling of the lower eyelid which constitute an ape's smile, or the rise and fall of the baboon's eyebrows and forehead in anger. The visitor from some other planet, so often imagined as coming to our earth and forming his judgments by what he sees, might well discern in the difference between man's face and the gorilla's muzzle some measure of the discrepancy within.

The brain being the instrument or organ of mind

anatomists comparing the brains of animals have looked for well-marked distinctions between the less and the more intelligent. In the natural order of Primates, to which man belongs with the monkeys and lemurs, the series of brains shows a remarkable rise or development from lower to higher forms. The lemur has a small and comparatively smooth brain, whereas the high anthropoid apes have brains which strikingly approach man's. In fact the lemur has very little mind in comparison with the sagacious and teachable chimpanzee or orang-utan. But man's reason so vastly surpasses that of the highest apes that naturalists have wondered at the likeness of their brain to ours, which is illustrated in the accompanying Fig. 7, representing the brain of the chimpanzee *a*, and of man *b*, whole on the left to show the convolutions, and cut across on the right to expose the interior. To compare their structure the two brains are drawn of the same size, but in fact the chimpanzee brain is much smaller than the human. It is one great difference between man and the anthropoid apes that his brain exceeds theirs in quantity; in a rough way he has three pounds of brain to their one. It is seen also that in the ape-brain the lobes or hemispheres have fewer and simpler windings than the more complex convolutions of the human brain, which in general outline they resemble. Now both size and complexity mean mind-power. The lobes of the brain consist within of the " white matter " with its innumerable fibres carrying nerve-currents, while the outer coating is formed of the " grey matter," containing the brain-corpuscles or cells from which the fibres issue, and which are centres through which the combinations are made which we are conscious of as thoughts. As the coating of grey matter follows the foldings of the brain down into the fissures, it is evident that the increased complexity of the convolutions, combined with greater actual size of brain, furnishes man with a vastly more extensive and intricate thinking-apparatus than the animals nearest below him in the order of nature.

Having looked at some of the important differences between the bodies of man and lower animals, we may venture to ask the still harder question, How far do their minds work like ours? No full answer can be given, yet there are some well-ascertained points to judge by. To begin, it is clear that the simple processes of sense, will, and action are carried on in man by the same bodily

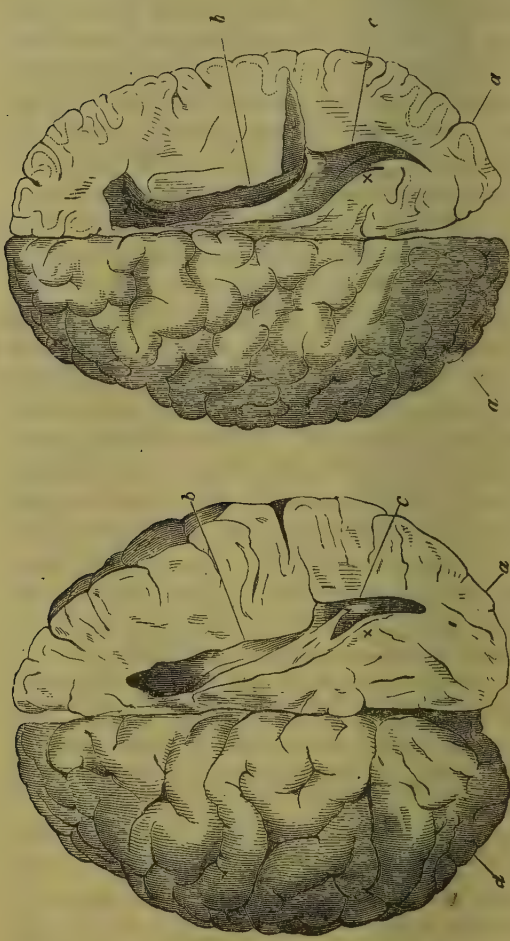


FIG. 7.—Brain of chimpanzee (*a*) and of man (*b*), seen from above, showing the cerebral hemispheres, whole on left, in section on right (after Huxley).

machinery as in other high vertebrate animals. How like their organs of sense are is well illustrated by the anatomist who dissects a bullock's eye as a substitute for a man's, to show how the picture of the outer world is thrown by the lenses on the retina or screen, into which spread the end-fibres of the optic nerve leading into the brain. Not but what the touch, sight, and other senses in the various orders of animals have their special differences, as where the eagle's eyes are focused to see small objects far beyond man's range, while the horse's eyes are so set in his head that they do not converge like ours, and he must practically have two pictures of the two sides of the road to deal with. Such special differences, however, make the general resemblance all the more striking. Next, the nervous system in beast and man shows the same common plan, the brain and spinal cord forming a central nervous organ, to which the sensory nerves convey the messages of the senses, and from which the motor nerves carry the currents causing muscular contraction and movement. The involuntary acts of animals are like our own, as when the sleeping dog draws his leg back if it is touched, much as his master would do, and when awake both man and beast wink when a finger pretends to strike at their eyes. If we go on to voluntary actions done with conscious will and thought, the lower creatures can for some distance keep company with mankind. At the Zoological Gardens one may sometimes see a handful of nuts divided between the monkeys inside the bars and the children outside, and it is instructive to notice how nearly both go through the same set of movements, looking, approaching, elbowing, grasping, cracking, munching, swallowing, holding out their hands for more. Up to this level, the monkeys show all the mental likeness to man that their bodily likeness would lead us to expect. Now we know that in the scramble there passes in the children's minds a great deal besides the mere sight and feel of the nuts, and the will to take and eat them. Between the sensation and action there takes place thought. To describe it simply, the boy knows a nut by sight, wishes to renew the pleasant taste of former nuts, and directs his hands and mouth to grasp, crack, and eat. But here are complicated mental processes. Knowing a nut by sight, or having an idea of a nut, means that there are grouped together in the child's mind memories of a number of past sensations, which

have so become connected by experience that a particular form and colour, feel and weight, lead to the expectation of a particular flavour. Of what here takes place in the boy's mind we can judge, though by no means clearly, from what we know about our own thoughts and what others have told us about theirs. What takes place in the monkeys' minds we can only guess by watching their actions, but these are so like the human as to be most readily explained by considering their brain-work also to be like the human, though less clear and perfect. It seems as though a beast's idea or thought of an object may be, as our own, a group of remembered sensations compacted into a whole. What makes this the more likely is that when part of the sensations present themselves the animal seems to judge that the rest must be there also, much as we ourselves are so apt to do. Thus a dog will jump upon a scum-covered stream which it takes for dry land, or when offered a sham biscuit will come for it, turning away when smell and taste prove that the rest of the idea does not agree with what sight suggested.

In much the same way, all people who attend to the proceedings of animals account for them by faculties more or less like their own. Not only do creatures of all high orders give unmistakable signs of pleasure and pain, but our dealings with the brutes go on the ground of their sharing with us such more complex emotions as fear, affection, anger, nay, even curiosity, jealousy, and revenge. Some of these show themselves in bodily symptoms which are quite human, as every one must admit who has felt the trembling limbs and throbbing heart of a frightened puppy, or looked at the picture, in Darwin's *Expression of the Emotions*, of the chimpanzee who has had his fruit taken from him, and displays his sulkiness by a pout which is a caricature of a child's. Again, the lower animals show a well-marked will, which like man's is not simply wish, but the resultant or balance of wishes, so that it is possible for two people calling a dog different ways, or both offering him bones, to distract his will in a way that reminds us of the philosopher's imaginary ass that died of starvation between its hay and its water. As to the power of memory in brutes, we have all had opportunities of noticing how lasting and exact it is. Some things which the animals remember may be explained simply by their ideas becoming associated through habit, as when the

horse betrays its former owner's ways by stopping at every public-house; this may only mean that the familiar door suggests to the beast the memory of rest, and he stops. But to watch a dog dreaming makes us think that whole trains of ideas from the storehouse of memory are passing before his consciousness, as in our dreams. A memory in which such a revival of the past is possible is a source of experience whence to extract understanding of the present and foresight of the future. To make the memory of what has been the means of controlling what shall be is the great intellectual faculty in man, and in simple and elementary forms it comes into view among lower creatures. To tell but one of the innumerable animal stories which show expectation and design founded on experience. A certain Mr. Cops, who had a young orang-utan, one day gave it half an orange, put the other half away out of its sight on a high press, and lay down himself on the sofa, but, the ape's movements attracting his attention, he only pretended to go to sleep; the creature came cautiously and satisfied himself of his master being asleep, then climbed up the press, ate the rest of the orange, carefully hid the peel among some shavings in the grate, examined the pretended sleeper again, and then went to lie down on his own bed. Such behaviour is only to be explained by a train of thought involving something of what in ourselves we call reason.

To measure the difference between beast and man is really more difficult than tracing their resemblances. One plain mark of the higher intellectual rank of man is that he is less dependent on instinct than the animals which migrate at a fixed season, or build nests of a fixed and complicated pattern peculiar to their kind. Man has some instincts plainly agreeing with those of inferior animals, such as the child's untaught movements to ward off danger, and the parental affection which preserves the offspring during the first defenceless period of life. But if man were possessed by a resistless longing to set off wandering southward before winter, or to build a shelter of boughs laid in a particular way, this would be less beneficial to his species than the use of intelligent judgment adapting his actions to climate, supply of food, danger from enemies, and a multitude of circumstances differing from district to district, and changing from year to year. If man's remote progenitors had instincts like the beavers' implanted in the very structure of their

brain, these instincts have long ago fallen away, displaced by freer and higher reason. Man's power of accommodating himself to the world he lives in, and even of controlling it, is largely due to his faculty of gaining new knowledge. Yet it must not be overlooked that this faculty is in a less measure possessed by other animals. We may catch them in the act of learning by experience, which is indeed one of the most curious sights in natural history, as when telegraph-wires are set up in a new district, and after the second year partridges no longer kill themselves by flying against them, or where in Canada the wily marten baffles the trapper's ingenuity, finding out how to get the bait away, even from a new kind of trap, without letting it fall. The faculty of learning by imitation comes out in the apes in an almost human way. The anthropoid ape Mafuka, kept lately in the Zoological Gardens at Dresden, saw how the door of her cage was unlocked, and not only did it herself, but even stole the key and hid it under her arm for future use; after watching the carpenter she seized his bradawl and bored holes with it through the little table she had her meals on; at her meals she not only filled her own cup from the jug, but, what is more remarkable, she carefully stopped pouring before it ran over. The death of this ape had an almost human pathos; when her friend the director of the gardens came to her, she put her arms round his neck, kissed him three times, and then lay down on her bed and giving him her hand fell into her last sleep. One cannot but think that creatures so sagacious must learn in their wild state. Indeed, less clever animals seem to some extent to teach their young, birds to sing, wolves to hunt, although it is most difficult for naturalists in such cases to judge what comes by instinct and what is consciously learnt.

Philosophers have tried to draw a hard and fast line between the animal and human mind. The most celebrated of these attempts is Locke's, where in his *Essay concerning Human Understanding* he lays it down that beasts indeed have ideas, but are without man's faculty of forming abstract or general ideas. Now it is true that we have learnt to reason with abstract ideas, such as solidity and fluidity, quantity and quality, vegetable and animal, courage and cowardice; and that there is not the least reason to suppose that such abstractions are formed by dogs or apes. But though the faculty of

thus abstracting and generalizing is one which rises to the highest flights of philosophic thought, it must be borne in mind that it begins in easy mental acts which seem quite possible to animals. Abstraction is noticing what several thoughts have in common, and neglecting their differences; thus a general idea is obtained by not attending too closely to particulars. The simplest form of this is when only one sense at a time is attended to, as in Locke's example of the idea of whiteness, as being that which chalk, snow, and milk, agree in. But, to judge by animals' actions, they also will attend to one sense at a time, as where a bull is excited by anything red. And it is most interesting to watch animals comparing a new object with their recollections or ideas of previous ones, practically recognizing in it what is already familiar, and expecting it to behave like other individuals of its class. Cats or monkeys do not require to be shown the use of a fresh rug or cushion, when it is at all like the old one it is put in place of, and the " dog of the regiment " will accept any man in the uniform as a master, whether he has seen him before or not. Thus, the very simplicity of animal thought foreshadows the results of man's higher abstraction and generalization. Let us now read a few lines farther in Locke, and we shall see why he concludes that animals have not the power of forming abstract ideas. It is, he says, because they have no use of words or other general signs. But this itself is an easier point, and far more worth arguing, than the hard question whether brutes have abstract ideas. In fact the power of speech gives about the clearest distinction that can be drawn between the action of mind in beast and man. It is far more satisfactory than another division attempted by philosophers who lay it down that while other animals have consciousness, man alone has self-consciousness, that is, he not only feels and thinks, but is aware of himself as feeling and thinking. Man, we know, is capable of this self-consciousness, which is cultivated by his being able to talk about himself as he does about other persons; but it has never been proved that animals, who we know are not apt to mistake their own bodies for anything outside, have no consciousness of themselves. When we study the rules of sign-making and language, we really have some means of contrasting the animals with ourselves. Evidently it is by means of language that the human mind has been able to work out and mark the

high abstract ideas we deal with so easily; without words, how could we have reached results of combined and compared thought such as momentum, plurality, righteousness? The great mental gap between us and the animals we study is well measured by the difference between their feeble beginnings in calling one another, and knowing when they are called, and man's capacity for perfect speech. It is not merely that the highest anthropoid apes have no speech; they have not the brain-organization enabling them to acquire even its rudiments. Man's power of using a word, or even a gesture, as the symbol of a thought and the means of conversing about it, is one of the points where we most plainly see him parting company with all lower species, and starting on his career of conquest through higher intellectual regions.

In the comparison of man with other animals the standard should naturally be the lowest man, or savage. But the savage is possessed of human reason and speech, while his brain-power, though it has not of itself raised him to civilization, enables him to receive more or less of the education which transforms him into a civilized man. To show how man may have advanced from savagery to civilization is a reasonable task, worked out to some extent in the later chapters of this volume. But there is no such evidence available for crossing the mental gulf that divides the lowest savage from the highest ape. On the whole, the safest conclusion warranted by facts is that the mental machinery of the lower animals is roughly similar to our own, up to a limit. Beyond this limit the human mind opens out into wide ranges of thought and feeling which the beast-mind shows no sign of approaching. If we consider man's course of life from birth to death, we see that it is, so to speak, founded on functions which he has in common with lower beings. Man, endowed with instinct and capable of learning by experience, drawn by pleasure and driven by pain, must like a beast maintain his life by food and sleep, must save himself by flight, or fight it out with his foes, must propagate his species and care for the next generation. Upon this lower framework of animal life is raised the wondrous edifice of human language, science, art, and law.

CHAPTER III

RACES OF MANKIND

Differences of Race, 43—Stature and Proportions, 43—Skull, 46—Features, 48—Colour, 51—Hair, 55—Constitution, 57—Temperament, 57—Types of Races, 58—Permanence, 60—Mixture, 62—Variation, 66—Races of Mankind classified, 68.

In the first chapter something has been already said as to the striking distinctions between the various races of man, seen in looking closely at the African negro, the Coolie of India, and the Chinese. Even among Europeans, the broad contrast between the fair Dane and the dark Genoese is recognized by all. Some further comparison has now to be made of the special differences between race and race, though the reader must understand that, without proper anatomical examination, such comparison can only be slight and imperfect. Anthropology finds race-differences most clearly in stature and proportions of limbs, conformation of the skull and the brain within, characters of features, skin, eyes, and hair, peculiarities of constitution, and mental and moral temperament.

In comparing races as to their stature, we concern ourselves, not with the tallest or shortest men of each tribe, but with the ordinary or average-sized men who may be taken as fair representatives of their whole tribe. The difference of general stature is well shown where a tall and a short people come together in one district. Thus in Australia the average English colonist of 5 ft. 8 in. looks clear over the heads of the 5 ft. 4in. Chinese labourers. Still more in Sweden does the Swede of 5 ft. 7 in. tower over the stunted Lapps, whose average measure is not much over 5 ft. Among the tallest of mankind are the Patagonians, who seemed a race of giants to the Europeans who first watched them striding along their cliffs draped in their skin cloaks; it was even declared that the heads of Magalhaens' men hardly reached the waist of the first Patagonian they met. Modern travellers find, on measuring them, that they

really often reach 6 ft. 4 in., their mean height being about 5 ft. 11 in.—three or four inches taller than average Englishmen. The shortest of mankind are the Bushmen and related tribes in South Africa, with an average height not far exceeding 4 ft. 6 in. A fair contrast between the tallest and shortest races of mankind may be seen in Fig. 8, where a Patagonian is drawn side by

Fig. 8.—Patagonian and Bushman.

side with a Bushman, whose head only reaches to his breast. Thus the tallest race of man is less than one-fourth higher than the shortest, a fact which seems surprising to those not used to measurements. Struck by the effect of such difference of stature, one is apt to form an exaggerated notion of its amount, which is really small compared with the disproportion in size between various breeds of other species of animals, as the toy pug and the mastiff, or the Shetland pony and

the dray-horse. In general, the stature of the women of any race may be taken as about one-sixteenth less than that of the men. Thus in England a man of 5 ft. 8 in. and a woman of 5 ft. 4 in. look an ordinary well-matched couple.

Not only the stature, but the proportions of the body differ in men of various races. Care must be taken not to confuse real race-differences with the alterations made by the individual's early training or habit of life, such as the bow-legs of grooms, and the still more crooked legs of the Indians of British Columbia, who get them misshaped by continually sitting cramped up in their canoes. A man's measure round the chest depends a good deal on his way of life, as do also the lengths of arm and leg, which are not even the same in soldiers and sailors. But there are certain distinctions which are inherited, and mark different races. Thus there are long-limbed and short-limbed tribes of mankind. The African negro is remarkable for length of arm and leg, the Aymara Indian of Peru for shortness. Supposing an ordinary Englishman to be altered to the build of a negro, he would want 2 in. more in the arm and 1 in. more in the leg, while to bring him to the proportions of an Aymara his arm would have to be shortened $\frac{1}{2}$ in. and his leg 1 in. from their present lengths. An instructive way of noticing these differences is to look back to the skeletons of apes and man (Fig. 5). In an upright position and reaching down with the middle finger, the gibbon can touch its foot, the orang its ankle, the chimpaanzee its knee, while man only reaches partly down his thigh. Here, however, there seems to be a real distinction among the races of man. Negro soldiers standing at drill bring the middle finger-tip an inch or two nearer the knee than white men can do, and some have been even known to touch the knee-pan. Such differences, however, are less remarkable than the general correspondence in bodily proportions of a model of strength and beauty, to whatever race he may belong. Even good judges have been led to forget the niceties of race-type and to treat the form of the athlete as everywhere one and the same. Thus Benjamin West, the American painter, when he came to Rome and saw the Belvedere Apollo, exclaimed, "It is a young Mohawk warrior!" Much the same has been said of the proportions of Zulu athletes. Yet if fairly-chosen photographs of Kafirs be compared with a classic

model such as the Apollo, it will be noticed that the trunk of the African has a somewhat wall-sided straightness, wanting in the inward slope which gives fineness to the waist, and in the expansion below which gives breadth across the hips, these being two of the most noticeable points in the classic model which our painters recognize as an ideal of manly beauty. By this kind of comparison much may be done in distinguishing standard types of races. Yet, while acknowledging the reality of such varieties in the build of men of different race, we have again to remark how slight they are compared with the variation in the limbs of different breeds of lower animals.

In comparing races, one of the first questions that occurs is whether people who differ so much intellectually as savage tribes and civilized nations show any corresponding difference in their brain. There is, in fact, a considerable difference. The most usual way of ascertaining the quantity of brain is to measure the capacity of the brain-case by filling skulls with shot or seed. Professor Flower gives as a mean estimate of the contents of skulls in cubic inches: Australian, seventy-nine; African, eighty-five; European, ninety-one. Eminent anatomists also think that the brain of the European is somewhat more complex in its convolutions than the brain of a Negro or Hottentot. Thus, though these observations are far from perfect, they show a connexion between a more full and intricate system of brain-cells and fibres and a higher intellectual power, in the races which have risen in the scale of civilization.

The form of the skull itself, so important in its relation to the brain within and the expressive features without, has been to the anatomist one of the best means of distinguishing races. It is often possible to tell by inspection of a skull what race it belongs to. The narrow cranium of the negro (Fig. 9 *a*) would not be mistaken for the broad cranium of the Samoyed (Fig. 9 *c*). On taking down from a museum shelf a certain narrow, wall-sided, roof-topped, forward-jawed skull with unusually strong brow-ridges (Fig. 10 *d*), there is no difficulty in recognizing it as Australian. In comparing skulls, some of the most easily noticeable distinctions are the following.

When looked at from the vertical or top view, the proportion of breadth to length is seen as in Fig. 9. Taking the diameter from back to front as 100, the

cross diameter gives the so-called index of breadth, which is here about 70 in the Negro (*a*), 80 in the European (*b*), and 85 in the Samoyed (*c*). Such skulls are classed respectively as *dolichokephalic*, or "long-headed"; *mesokephalic*, or "middle-headed"; and *brachykephalic*, or "short-headed." A model skull of a flexible material like gutta-percha, if of the middle shape, like that of an ordinary Englishman, might, by pressure at the sides, be made long like a negro's, or by pressure at back and front be brought to the broad Tatar form. In the figure below it may be noticed that while some skulls, as *b*, have a somewhat elliptical form, others, as *a*, are ovoid, having the longest cross diameter considerably behind the centre. Also in some classes of skulls, as in

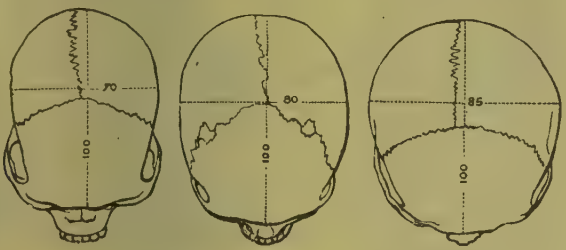


FIG. 9.—Top view of skulls. *a*, Negro, index 70, dolichokephalic; *b*, European, index 80, mesokephalic; *c*, Samoyed, index 85, brachykephalic.

a, the zygomatic arches connecting the skull and face are fully seen; while in others, as *b* and *c*, the bulging of the skull almost hides them. In the front and back view of skulls, the proportion of width to height is taken in much the same way as the index of breadth just described. Next, Fig. 10, which represents in profile the skulls of an Australian (*d*), a negro (*e*), and an Englishman (*f*), shows the strong difference in the facial angle between the two lower races and our own. The Australian and African are *prognathous*, or "forward-jawed," while the European is *orthognathous*, or "upright-jawed." At the same time the Australian and African have more retreating foreheads than the European, to the disadvantage of the frontal lobes of their brain as compared with ours. Thus the upper and lower parts of the profile combine to give the faces of these less-

civilized peoples a somewhat ape-like slope, as distinguished from the more nearly upright European face.

Not to go into nicer distinctions of cranial measurement, let us now glance at the evident points of the living face. To some extent feature directly follows the shape of the skull beneath. Thus the contrast just mentioned, between the forward-sloping negro skull and its more upright form in the white race, is as plainly seen in the portraits of a Swaheli negro and a Persian, given in Fig. 11. On looking at the female portraits in Fig. 12, the Barolong girl (South African) may be selected

FIG. 10.—Side view of skulls. *d*, Australian, prognathous; *e*, African, prognathous; *f*, European, orthognathous.

as an example of the effect of narrowness of skull (*b*), in contrast with the broader Tatar, and North American faces (*d*, *f*). She also shows the convex African forehead, while they, as well as the Hottentot (*c*), show the effect of high cheek-bones. The Tatar and Japanese faces (*d*, *e*) show the skew-eyelids of the Mongolian race. Much of the character of the human face depends on the shape of the softer parts—nose, lips, cheeks, chin, &c., which are often excellent marks to distinguish race. Contrasts in the form of nose may even exceed that here shown between the aquiline of the Persian and the snub of the Negro in Figs. 11 and 13. European travellers in Tartary in the Middle Ages described its

flat-nosed inhabitants as having no noses at all, but breathing through holes in their faces. By pushing the tips of our own noses upward, we can in some degree imitate the manner in which various other races, notably the negro, show the opening of the nostrils in full face. Our thin, close-fitting lips differ in the extreme from those of the negro, well seen in the portrait (Fig. 13) of Jacob Wainwright, Livingstone's faithful boy. We cannot imitate the negro lip by mere pouting, but must push the edges up and down with the fingers to show more of the inner lip. The expression of the human

a *b*

FIG. 11.—*a*, Swaheli; *b*, Persian.

face, on which intelligence and feeling write themselves in visible characters, requires an artist's training to understand and describe. The mere contour of the features, as taken by photography in an unchanging attitude, has delicate characters which we appreciate by long experience in studying faces, but which elude exact description or measurement. With the purpose of calling attention to some well-marked peculiarities of the human face in different races, a small group of female faces (Fig. 12) is here given, all young, and such as would be considered among their own people as at least moderately handsome. Setting aside hair and complexion, there is still enough difference in the actual outline of the features to distinguish the Negro, Kafir, Hottentot, Tatar, Japanese, and North American faces from the English face below.

FIG. 12.—Female portraits. *a*, Negro (W. Africa); *b*, Barolong (S. Africa); *c*, Hottentot; *d*, Gilyak (N. Asia); *e*, Japanese; Colorado Indian (N. America); *g*, English.

The colour of the skin, that important mark of race, may be best understood by looking at the darkest variety. The dark hue of the negro does not lie so deep as the innermost or true skin, which is substantially alike among all races of mankind. The seat of the colouring is well shown in Fig. 14, a highly magnified section of the skin of a negro. Here *a* shows the surface of the true skin with its papillæ; this is covered by the mucous layer, the innermost cells of which (*b*) are deeply

FIG. 13.—African negro.

coloured by small grains of black or brown pigment, the colour shading down to brownish or yellowish toward the outer surface of this mucous layer (*c*), while even the outside scarf-skin (*d*) is slightly tinged. The negro, in spite of his name, is not black, but deep brown, and even this darkest hue does not appear at the beginning of life, for the new-born negro child is reddish-brown, soon becoming slaty grey, and then darkening. Nor does the darkest tint ever extend over the negro's whole body, but his soles and palms are brown. When Blumenbach, the anthropologist, saw Kemble play Othello (made

up in the usual way, with blackened face and black gloves, to represent a negro) he complained that the whole illusion was spoilt for him when the actor opened his hands. The brown races, such as the native Americans, have the colouring of the skin in a less degree than the Africans, and with them also it is not till some time after birth that the full depth of complexion is reached. The colouring of the dark races appears to be similar in nature to the temporary freckling and sun-burning of the fair white race. Also, Europeans have permanent

FIG. 14.—Section of negro skin, much magnified (after Kölliker). *a*, dermis, or true skin; *b*, *c*, rete mucosum; *d*, epidermis, or scarf-skin.

dark colouring in some portions of the skin, though not exposed to the sun; the areola of the breast, for instance; while in certain affections, known by the medical name of melanism, patches closely resembling negro skin appear on the body. On the whole it seems that the distinction of colour, from the fairest Englishman to the darkest African, has no hard and fast lines, but varies gradually from one tint to another. It is instructive to notice that there occur in the various races certain individuals in whom the colouring matter of the skin is wanting, the so-called albinos. The contrast between their morbid whiteness and any ordinary fairness of complexion is

most remarkable in the negro albinos (to call them by this self-contradictory term), who have the well-known African features, but in dead white, as it were a cast of a negro in plaster.

The natural hue of skin farthest from that of the negro is the complexion of the fair race of Northern Europe, of which perfect types are to be met with in Scandinavia, North Germany, and England. In such fair or blonde people the almost transparent skin has its pink tinge by showing the small blood-vessels through it. In the nations of Southern Europe, such as Italians and Spaniards, the browner complexion to some extent hides this red, which among darker peoples in other quarters of the world ceases to be discernible. Thus the difference between light and dark races is well observed in their blushing, which is caused by the rush of hot red blood into the vessels near the surface of the body. Albinos show this with the utmost intenseness, not only a general glow appearing, but the patches of colour being clearly marked out. The blush, vivid through the blonde skin of the Dane, is more obscurely seen in the Spanish brunette; but in the dark-brown Peruvian, or the yet blacker African, though a hand or a thermometer put to the cheek will detect the blush by its heat, the somewhat increased depth of colour is hardly perceptible to the eye. The contrary effect, paleness, caused by retreat of blood from the surface, is in like manner masked by dark tints of skin.

As a character of race, the colour of the skin has from ancient times been reckoned the most distinctive of all. The Egyptian painters, three or four thousand years ago used regular tints for this purpose, as may be seen in paintings at the British Museum. These colours do not pretend to be exact, as is seen by the native Egyptian gentlemen being painted dark brick-red, but the ladies pale yellow, so as to signify in an exaggerated way their lighter complexion. It was in this conventional manner that they coloured the four principal races of mankind known to them, the Egyptians themselves red-brown, the nations of Palestine yellow-brown, the Libyans yellow-white, and the Æthiopians coal-black (see page 3). In the history of the world, colour has often been the sign by which nations accounting themselves the nobler have marked off their inferiors. The Sanskrit word for caste is *varna*, that is, "colour"; and this shows how their distinction of high and low

caste arose. India was inhabited by dark indigenous peoples before the fairer Aryan race invaded the land, and the descendants of conquerors and conquered are still in some measure to be traced among the light-complexioned high-caste, and the dark-complexioned low-caste families. Nor has the distinction of colour ceased in the midst of modern civilization. The Englishman's white skin is to him, as of old, a caste-mark of separation from the yellow, brown, or black " natives," as he contemptuously calls them, in other quarters of the globe.

The range of complexion among mankind, beginning with the tint of the fair-whites of Northern Europe and the dark-whites of Southern Europe, passes to the brownish-yellow of the Malays, and the full-brown of American tribes, the deep-brown of Australians, and the black-brown of Negroes. Until modern times these race-tints have generally been described with too little care, and named as conventionally as the Egyptians painted them. Now, however, the traveller by using Broca's set of pattern colours, records the colour of any tribe he is observing, with the accuracy of a mercer matching a piece of silk. The evaporation from the human skin is accompanied by a smell which differs in different races. The peculiar rancid scent by which the African negro may be detected even at a distance is the most marked of these. The odour of the brown American tribes is again different, while they have been known to express dislike at the white man's smell. This peculiarity, which not only indicates difference in the secretions of the skin, but seems connected with liability to certain fevers, &c., is a race-character of some importance.

The part of the human body which shows the greatest variety of colour in different individuals, is the iris of the eye. This is the more noticeable because the adjacent parts vary particularly little among mankind. The sclerotic coat, which in a healthy European is almost what it is called, the " white " of the eye, only takes a slightly yellow tinge among the darkest races, as the African negro. Again, in ordinary eyes of all races, the pupil in the centre of the iris appears absolutely black, being in fact transparent, and showing through to the black pigment lining the choroid coat at the back of the eye. But the iris itself, if examined in a number of types of men, has most various colour. In understanding the coloration of the eye, as of the skin, the peculiarities

of albinos are instructive. The pink of their eyes (as of white rabbits) is caused by absence of the black pigment above-mentioned, so that light passing out through the iris and pupil is tinged red from the blood-vessels at the back; thus their eyes may be seen to blush with the rest of the face. This want of the protecting black pigment also accounts for the sensitiveness to light which makes albinos avoid a glare; it was for this reason that the Dutch gave them the name of *kakkerlaken*, or "cock-roaches," these creatures also shunning the light. Prof. Broca, in his scale of colours of eyes, arranges shades of orange, green, blue, and violet-grey. But one has only to look closely into any eye to see the impossibility of recording its complex pattern of colours; indeed what is done is to observe it from a distance so that its tints blend into one uniform hue. It need hardly be said that what are popularly called black eyes are far from having the iris really black like the pupil; eyes described as black are commonly of the deepest shades of brown or violet. These so-called black eyes are by far the most numerous in the world, belonging not only to brown-black, brown, and yellow races, but even prevailing among the darker varieties of the white race, such as Greeks and Spaniards. Aristotle remarks that the colour of the eyes follows that of the skin. Indeed it is plain that there is a connection of the colours of the skin, eyes, and hair among mankind. In races with the darker skin and black hair, the darkest eyes generally prevail while a fair complexion is usually accompanied by the lighter tints of iris, especially blue. A fair Saxon with black eyes, or a full-grown negro with pale blue eyes, would be looked at with surprise. Yet we know by our own country-people how difficult it is to lay down exact rules as to matching colours in complexion. Thus the combination of black hair with dark blue or grey eyes is frequent in some districts of Great Britain. Dr. Barnard Davis and Dr. Beddoe think it indicates Keltic Blood.

From ancient times, the colour and form of the hair have been noticed as distinctive marks of race. Thus Strabo mentions the Æthiopians as black men with woolly hair, and Tacitus describes the German warriors of his day with their fierce blue eyes and tawny hair. As to colour of hair, the most usual is black, or shades so dark as to be taken for black, which belongs not only to the dark-skinned Africans and Americans, but to the

yellow Chinese and the dark-whites such as Hindus or Jews. Mr. Sorby remarks that blackness of hair is due to black pigment being present in such quantity as to overpower whatever red or yellow pigment the hair may also contain. In the fair-white peoples of Northern Europe, on the contrary, flaxen or chestnut hair prevails. Thus we see that there is a connection between fair hair and fair skin, and dark hair and dark skin. But it is impossible to lay down a rule for intermediate tints, for the red-brown or auburn hair common in fair-skinned peoples occurs among darker races, and dark-brown hair has a still wider range. Our own extremely mixed nation shows every variety from flaxen and golden to raven black. As to the form of the hair, its well-known differences may be seen in the female portraits in Fig. 12, where the Africans on the left show the woolly or frizzy

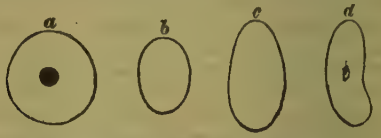


FIG. 15.—Sections of hair, highly magnified (after Pruner). *a*, Japanese; *b*, German; *c*, African negro; *d*, Papuan.

kind, where the hair naturally curls into little corkscrew-spirals, while the Asiatic and American heads on the right have straight hair like a horse's mane. Between these extreme kinds are the flowing or wavy hair, and the curly hair which winds in large spirals; the English hair in the figure is rather of the latter variety. If cross-sections of single hairs are examined under the microscope, their differences of form are seen as in four of the sections by Pruner-Bey (Fig. 15). The almost circular Mongolian hair (*a*) hangs straight; the more curly European hair (*b*) has an oval or elliptical section; the woolly African hair (*c*) is more flattened; while the frizzy Papuan hair (*d*) is a yet more extreme example of the flattened ribbon-like kind. Curly and woolly hair has a lop-sided growth from the root which gives the twist. Not only the colour and form of the hair, but its quantity, vary in different races. Thus the heads of the Bushmen are more scantily furnished with hair than ours, while among the Crow Indians it was common for

the warrior's coarse black hair to sweep on the ground behind him. The body-hair also is scanty in some races and plentiful in others. Thus the Ainos, the indigenes of Yeso, are a shaggy people, while the Japanese possessors of their island are comparatively hairless. So strong is the contrast that the Japanese have invented a legend that in ancient times the Aino mothers suckled young bears, which gradually developed into men.

That certain races are constitutionally fit and others unfit for certain climates is a fact which the English have but too good reason to know, when on the scorching plains of India they themselves become languid and sickly, while their children have soon to be removed to some cooler climate that they may not pine and die. It is well known also that races are not affected alike by certain diseases. While in Equatorial Africa or the West Indies the coast-fever and yellow-fever are so fatal or injurious to the new-come Europeans, the negroes and even mulattoes are almost untouched by this scourge of the white nations. On the other hand, we English look upon measles as a trifling complaint, and hear with astonishment of its being carried into Fiji, and there, aggravated no doubt by improper treatment, sweeping away the natives by thousands. It is plain that nations moving into a new climate, if they are to flourish, must become adapted in body to the new state of life; thus in the rarefied air of the high Andes more respiration is required than in the plains, and in fact tribes living there have the chest and lungs developed to extraordinary size. Races, though capable of gradual acclimatization, must not change too suddenly the climate they are adapted to. With this adaptation to particular climates the complexion has much to do, fitting the negro for the tropics and the fair-white for the temperate zone; though, indeed, colour does not always vary with climate, as where in America the brown race extends through hot and cold regions alike. Fitness for a special climate, being matter of life or death to a race, must be reckoned among the chief of race-characters.

Travellers notice striking distinctions in the temper of races. There seems no difference of condition between the native Indian and the African negro in Brazil to make the brown man dull and sullen, while the black is overflowing with eagerness and gaiety. So, in Europe, the unlikeness between the melancholy Russian peasant and the vivacious Italian can hardly depend altogether

on climate and food and government. There seem to be in mankind inbred temperament and inbred capacity of mind. History points the great lesson that some races have marched on in civilization while others have stood still or fallen back, and we should partly look for an explanation of this in differences of intellectual and moral powers between such tribes as the native Americans and Africans, and the Old World nations who overmatch and subdue them. In measuring the minds of the lower races, a good test is how far their children are able to take a civilized education. The account generally given by European teachers who have had the children of lower races in their schools is that, though these often learn as well as the white children up to about twelve years old, they then fall off, and are left behind by the children of the ruling race. This fits with what anatomy teaches of the less development of brain in the Australian and African than in the European. It agrees also with what the history of civilization teaches, that up to a certain point savages and barbarians are like what our ancestors were and our peasants still are, but from this common level the superior intellect of the progressive races has raised their nations to heights of culture. The white man, though now dominant over the world, must remember that intellectual progress has been by no means the monopoly of his race. At the dawn of history, the leaders of culture were the brown Egyptians, and the Babylonians, whose Akkadian is not connected with the language of white nations, while the yellow Chinese, whose Tatar affinity is evident in their hair and features, have been for four thousand years or more a civilized and literary nation. The dark-whites, Assyrians, Phœnicians, Persians, Greeks, Romans, did not start but carried on the forward movement of culture, while since then the fair-whites, as part of the population of France, Germany, and England, have taken their share not meanly though latest in the world's progress.

After thus noticing some of the chief points of difference among races, it will be well to examine more closely what a race is. Single portraits of men and women can only in a general way represent the nation they belong to, for no two of its individuals are really alike, not even brothers. What is looked for in such a race-portrait is the general character belonging to the whole race. It is an often repeated observation of travellers that a European landing among some people unlike his own,

such as Chinese or Mexican Indians, at first thinks them all alike. After days of careful observation he makes out their individual peculiarities, but at first his attention was occupied with the broad typical characters of the foreign race. It is just this broad type that the anthropologist desires to sketch and describe, and he selects as his examples such portraits of men and women as show it best. It is even possible to measure the type of a people. To give an idea of the working of this problem, let us suppose ourselves to be examining Scotsmen, and the first point to be settled how tall they are. Obviously there are some few as short as Lapps, and some as tall as Patagonians; these very short and tall men belong to the race, and yet are not its ordinary members. If, however, the whole population were measured and made to stand in order of height, there would be a crowd of men about five feet eight inches, but much fewer of either five feet four inches or six feet, and so on till the

FIG. 16.—Race or Population arranged by Stature (Galton's method).

numbers decreased on either side to one or two giants, and one or two dwarfs. This is seen in Fig. 16, where each individual is represented by a dot, and the dots representing men of the mean or typical stature crowd into a mass. After looking at this, the reader will more easily understand Quetelet's diagram, Fig. 17, where the heights or ordinates of the binomial curve show the numbers of men of each stature, decreasing both ways from the central five feet eight inches which is the stature of the mean or typical man. Here, in a total of near 2,600 men, there are 160 of five feet eight inches, but only about 150 of five feet seven inches or five feet nine inches, and so on, till not even ten men are found so short as five feet or so tall as six feet four inches. As the proverb says, "it takes all sorts to make a world," so it thus appears that a race is a body of people comprising a regular set of variations, which centre round one representative type. In the same way a race or nation is estimated as to other characters, as where a mean or typical Englishman may be said to measure

36 inches round the chest, and weigh about 144 pounds. So it is possible to fix on the typical shade of complexion in a nation, such as the Zulu black-brown. The result of these plans is to show that the rough-and-ready method of the traveller is fairly accurate, when he chooses as his representative of a race the type of man and woman which he finds to exist more numerously than any other.

The people whom it is easiest to represent by single portraits are uncivilized tribes, in whose food and way of life there is little to cause difference between one man and another, and who have lived together and intermarried for many generations. Thus Fig. 18, taken from a photograph of a party of Caribs, is remarkable for the close likeness running through all. In such a

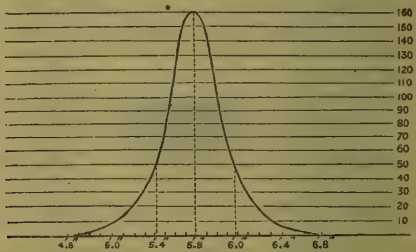


FIG. 17.—Race or Population arranged by Stature (Quetelet's method).

nation the race-type is peculiarly easy to make out. It is by no means always thus easy to represent a whole population. To see how difficult it may be, one has only to look at an English crowd, with its endless diversity. But to get a view of the problem of human varieties, it is best to attend to the simplest cases first, looking at some uniform and well-marked race, and asking what in the course of ages may happen to it.

The first thing to be noticed is its power of lasting. Where a people lives on in its own district, without too much change in habits, or mixture with other nations, there seems no reason to expect its type to alter. The Egyptian monuments show good instances of this permanence. In Fig. 19, *a* is drawn from the head of a statue of Rameses, evidently a careful portrait, and dating from about 3,000 years ago, while *b* is an Egyptian of the present day, yet the ancient and modern are

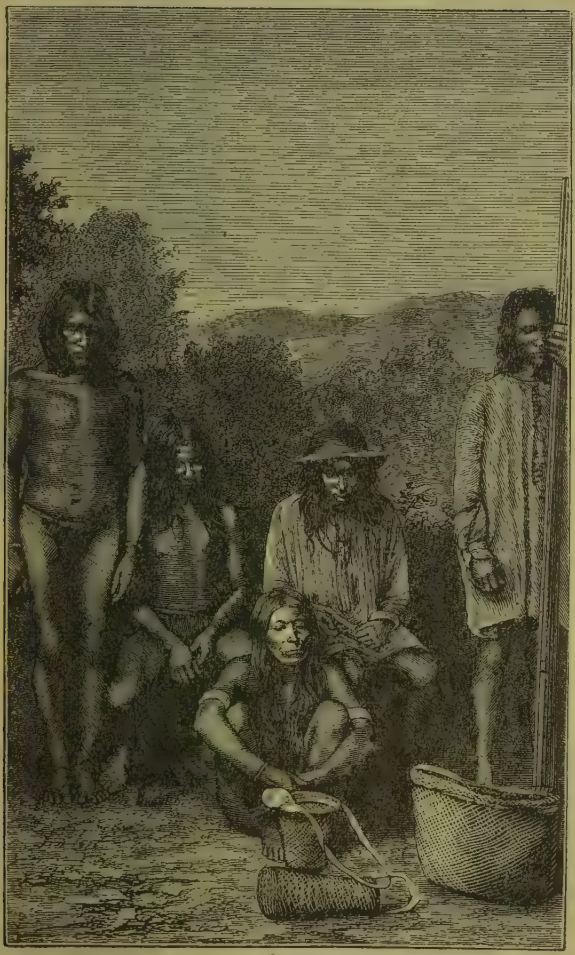


FIG. 18.—Caribs.

curiously alike. Indeed, the ancient Egyptian race, who built the Pyramids, and whose life of toil is pictured on the walls of the tombs, are with little change still represented by the fellahs of the villages, who carry on the old labour under new tax-gatherers. Thus, too, the Æthiopians on the early Egyptian bas-reliefs may have their counterparts picked out still among the White Nile tribes, while we recognize in the figures of Phœnician or Israelite captives the familiar Jewish profile of our own day. Thus there is proof that a race may keep its

a *b*

FIG. 19.—(*a*) Head of Rameses II., Ancient Egypt. (*b*) Sheikh's son, Modern Egypt (after Hartmann).

special characters plainly recognizable for over thirty centuries, or a hundred generations. And this permanence of type may more or less remain when the race migrates far from its early home, as when African negroes are carried into America, or Israelites naturalize themselves from Archangel to Singapore. Where marked change has taken place in the appearance of a nation, the cause of this change must be sought in intermarriage with foreigners, or altered conditions of life, or both.

The result of intermarriage or crossing of races is familiar to all English people in one of its most conspicuous examples, the cross between white and negro called mulatto (Spanish *mulato*, from *mula*, a mule).

The mulatto complexion and hair are intermediate between those of the parents, and new intermediate grades of complexion appear in the children of white and mulatto, called quadroon or quarter-blood (Spanish *cuarteron*), and so on; on the other hand, the descendants of negro and mulatto, called sambo (Spanish *zambo*) return towards the full negro type. This intermediate character is the general nature of crossed races, but with

FIG. 20.—Malay Mother and Half-caste Daughters.

more or less tendency to revert to one or other of the parent types. To illustrate this, Fig. 20 gives the portrait of a Malay mother and her half-caste daughters, the father being a Spaniard; here, while all the children show their mixed race, it is sometimes the European and sometimes the Malay cast of features that prevails. The effect of mixture is also traceable in the hair, as may often be well noticed in a mulatto's crimped, curly locks, between the straighter European and the woolly African kind. The Cafusos of Brazil, a peculiar cross

between the native tribes of the land and the imported negro slaves, are remarkable for their hair, which rises in a curly mass, forming a natural periwig which obliges the wearers to stoop low in passing through their hut doors. This is seen in the portrait of a Cafusa, Fig. 21, and seems easily accounted for by the long stiff hair of the native American having acquired in some degree the negro frizziness. The bodily temperament of mixed races also partakes of the parent-characters, as is seen in the mulatto who inherits from his negro ancestry the power of bearing a tropical climate, as well as freedom from yellow fever.

FIG. 21.—Cafusa Woman.

Not only does a mixed race arise wherever two races inhabit the same district, but within the last few centuries it is well known that a large fraction of the world's population has actually come into existence by race-crossing. This is nowhere so evident as on the American continent, where since the Spanish conquest such districts as Mexico are largely peopled by the mestizo descendants of Spaniards and native Americans, while the importation of African slaves in the West Indies has given rise to a mulatto population. By taking into account such inter-crossing of races, anthropologists have a reason to give for the endless shades of diversity among mankind, without attempting the hopeless task of classifying every little uncertain group of men into a special race. The

water-carrier from Cairo, in Fig. 22, may serve as an example of the difficulty of making a systematic arrangement to set each man down to his precise race. This man speaks Arabic, and is a Moslem, but he is not an Arab proper, neither is he an Egyptian of the old king-

FIG. 22.—Cairene.

dom, but the child of a land where the Nubian, Copt, Syrian, Bedouin, and many other peoples have mingled for ages, and in fact his ancestry may come out of three quarters of the globe. Among the natives of India, a variety of complexion and feature is found which cannot be classified exactly by race. But it must be remembered that several very distinct varieties of men have contributed to the population of the country, namely the dark-brown

indigenes or hill-tribes, the yellow Mongolians who have crossed the frontiers from Tibet, and the fairer ancient Aryans or Indo-Europeans who poured in from the north-west, not to mention others. The mixture of these nations going on for ages has of course produced numberless crosses. So in Europe, taking the fair nations of the Baltic and the dark nations of the Mediterranean as two distinct races or varieties, their intercrossing may explain the infinite diversity of brown hair and intermediate complexion to be met with. If, then, it may be considered that man was already divided into a few great main races in remote antiquity, their intermarriage through ages since will go far to account for the innumerable slighter varieties which shade into one another.

It is not enough to look at a race of men as a mere body of people happening to have a common type or likeness. For the reason of their likeness is plain, and indeed our calling them a race means that we consider them a breed whose common nature is inherited from common ancestors. Now experience of the animal world shows that a race or breed, while capable of carrying on its likeness from generation to generation, is also capable of varying. In fact, the skilful cattle-breeder, by carefully choosing and pairing individuals which vary in a particular direction, can within a few years form a special breed of cattle or sheep. Without such direct interference of man, special races or breeds of animals form themselves under new conditions of climate and food, as in the familar instances of the Shetland ponies, or the mustangs of the Mexican plains which have bred from the horses brought over by the Spaniards. It naturally suggests itself that the races of man may be thus accounted for as breeds, varied from one original stock. It may be strongly argued in this direction that not only do the bodily and mental varieties of mankind blend gradually into one another, but that even the most dissimilar races can intermarry in all directions, producing mixed or sub-races which, when left to themselves, continue their own kind. Advocates of the polygenist theory, that there are several distinct races of man, sprung from independent origins, have denied that certain races, such as the English and native Australians, produce fertile half-breeds. But the evidence tends more and more to establish crossing as possible between all races, which goes to prove that all the varieties of mankind are zoologically of one species. While this

principle seems to rest on firm ground, it must be admitted that our knowledge of the manner and causes of race-variation among mankind is still very imperfect. The great races, black, brown, yellow, white, had already settled into their well-known characters before written record began, so that their formation is hidden far back in the præhistoric period. Nor are alterations of such amount known to have taken place in any people within the range of history. It has been plausibly argued that our rude primitive ancestors, being less able than their posterity to make themselves independent of climate by shelter and fire and stores of food, were more exposed to alter in body under the influence of the new climates they migrated into. Even in modern times it seems possible to trace something of race-change going on under new conditions of life. Thus Dr. Beddoe's measurements prove that in England the manufacturing town-life has given rise to a population an inch or two less in stature than their forefathers when they came in from their country villages. So in the Rocky Mountains there are clans of Snake Indians whose stunted forms and low features, due to generations of needy outcast life, mark them off from their better nourished kinsfolk in the plains. It is asserted that the pure negro in the United States has undergone a change in a few generations which has left him a shade lighter in complexion and altered his features, while the pure white in the same region has become less rosy, with darker and more glossy hair, more prominent cheek-bones and massive lower jaw. These are perhaps the best authenticated cases of race-change. There is great difficulty in watching a race undergoing variation, which is everywhere masked by the greater changes caused by new nations coming in to mingle and intermarry with the old. He who should argue from the Greek sculptures that the national type has changed since the age of Perikles would be met with the answer that the remains of the old stock have long been inextricably blended with others. The points which have now been brought forward will suffice to show the uncertainty and difficulty of any attempt to trace exactly the origin and course of the races of man. Yet at the same time there is a ground-work to go upon in the fact that these races are not found spread indiscriminately over the earth's surface, but certain races plainly belong to certain regions, seeming each to have taken shape under the influence of climate

and soil in its proper district, where it flourished, and whence it spread far and wide, modifying itself and mingling with other races as it went. The following brief sketch may give an idea how the spreading and mixture of the great races may have taken place. It embodies well-considered views of eminent anatomists, especially Professors Huxley and Flower. Though such a scheme cannot be presented as proved and certain, it is desirable to clear and fix our ideas by understanding that man's distribution over the earth did not take place by promiscuous scattering of tribes, but along great lines of movement whose regularity can be often discerned, where it cannot be precisely followed out.

That there is a real connexion between the colour of races and the climate they belong to seems most likely from the so-called black peoples. Ancient writers were satisfied to account for the colour of the Æthiopians by saying that the sun had burnt them black, and though modern anthropologists would not settle the question in this off-hand way, yet the map of the world shows that this darkest race-type is principally found in a tropical climate. The main line of black races stretches along the hot and fertile regions of the equator, from Guinea in West Africa to that great island of the Eastern Archipelago which has its name of New Guinea from its negro-like natives. That these black peoples have originated from a common centre seems probable from their general agreement in bodily characters, though with well-marked variations following their geographical distribution. The attention of anthropologists has been particularly attracted by a line of islands in the Sea of Bengal, the Andamans, which were found inhabited by a scanty population of rude and child-like savages, shown in Fig. 23, as photographed by Dr. G. E. Dobson, in their native forest, who are small in stature (the men under five feet), with skin of negro darkness, and hair very flat in section and frizzled, which from their habit of shaving their heads must be imagined by the reader. But while in these points resembling the African negro, they are unlike him in having skulls, not narrow, but broad and rounded, nor have they lips so full, a nose so wide, or jaws so projecting as his. It has occurred to anatomists, and the opinion has been strengthened by Flower's study of their skulls, that the Andaman tribes may be a remnant of a very early human stock, perhaps the best representatives of the primitive negro type,

which has since altered in various points in its spread over its wide district of the world. The African negro race, with its special marks of narrow skull, projecting jaws, black-brown skin, woolly hair, flattened nose, full and out-turned lips, has already been here described (see pages 46 to 53). Its type perhaps shows itself most

FIG. 23.—Andaman Islanders (after Dobson).

perfectly in the nations near the equator, as in Guinea, but it spreads far and wide over the continent, shading off by crossing with lighter coloured races on its borders, such as the Berbers in the north and the Arabs on the east coast. As the race spreads southward into Congo and the Kafir regions, there is noticed a less full negro complexion and feature, looking as though migration from the central region into new climates had somewhat modified the type. In this respect the small-grown

Hottentot-Bushman tribes of South Africa (see Figs. 8, 12 *c*) are most remarkable, for while keeping much negro character in the narrow skull, frizzy hair, and cast of features, their skin is of a lighter tint of brownish-yellow. There is nothing to suggest that this came by crossing the negro type with a fairer race, indeed there is no evidence of such a race to cross with. If the Bushman

Fig. 24.—Aheta (Negrito), Philippine Islands.

is a special modification of the Negro, then this is an excellent case of the transformation of races when placed under new conditions. To return now to Southern Asia, there are found in the Malay Peninsula and the Philippines scanty forest-tribes apparently allied to the Andamaners and classed under the general term Negritos (*i.e.* " little blacks "), seeming to belong to a race once widely spread over this part of the world, whose remnants have been driven by stronger new-come races to find refuge in the mountains. Fig. 24, represents one of

them, an Aheta from the island of Luzon. Lastly come the widespread and complicated varieties of the eastern negroid race in the region known as Melanesia, the "black islands," extending from New Guinea to Fiji. The group of various islanders (Fig. 25) belonging to Bishop Patterson's mission shows plainly the resemblance to the African negro, though with some marked points of difference, as in the brows being more strongly ridged,

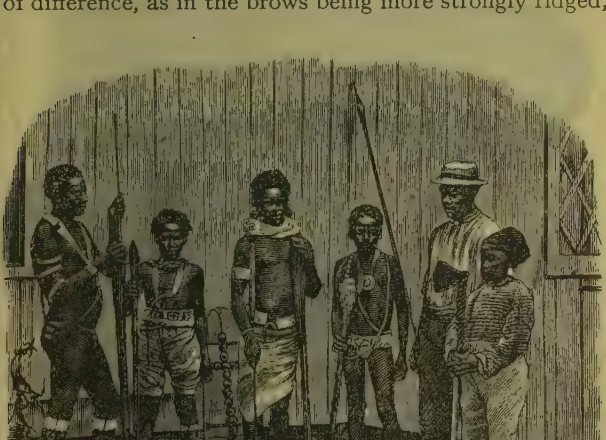


FIG. 25.—Melanesians.

and the nose being more prominent, even aquiline—a striking contrast to the African. The Melanesians about New Guinea are called Papuas from their woolly hair (Malay *papuwah* = frizzed), which is often grown into enormous mops. The great variety of colour in Melanesia, from the full brown-black down to chocolate or nut-brown, shows that there has been much crossing with lighter populations. Such mixture is evident in the inhabitants of Fiji, where the dark Melanesian race is indeed predominant, but crossed with the lighter

Fig. 26.—South Australian (man).

Fig. 27.—South Australian (woman).

FIG. 28.—Australian (Queensland) women.

Polynesian race; such mixture accounts for the connexion of Melanesian and Polynesian speech. Lastly, the Tasmanians were a distant outlying population belonging to the eastern blacks.

In Australia, that vast island-continent, whose plants

and animals are not those of Asia, but seem as it were survivors from a long-past period of the earth's history, there appears a thin population of roaming savages, strongly distinct from the blacker races of New Guinea at the north and Tasmania at the south. The Australians, with skin of dark chocolate-colour, may be taken as a special type of the brown races of man. While their skull is narrow and prognathous like the negro's,

Fig. 29.—Dravidian hill-man (after Fryer).

it differs from it in special points which have been already mentioned (page 46), and has, indeed, peculiarities which distinguish it very certainly from that of other races. In the portraits of Australians, Figs. 26, 27, 28, there may be noticed the heavy brows and projecting jaws, the wide but not flat nose, the full lips, and the curly but not woolly black hair. Looking at the map of the world to see where brown races next appear, good authorities define one on the continent of India. There the hill-tribes present the type of the old dwellers in

south and central India before the conquest by the Aryan Hindus, and its purest form appears in tribes hardly tilling the soil, but living a wild life in the jungle, while the great mass, more mixed in race with the

FIG. 30.—Kalmuk (after Goldsmid).

Hindus, under whose influence they have been for ages, now form the great Dravidian nations of the south, such as the Tamil and Telugu. Fig, 29 represents one of the ruder Dravidians, from the Travancore forests. Farther west, it has been thought that a brown race may be distinguished in Africa, taking in Nubian tribes, and less distinctly traceable in the Berbers of Algiers

and Tunis. If so, to this race the ancient Egyptians would seem mainly to belong, though mixed with Asiatics, who from remote antiquity came in over the Syrian border. The Egyptian drawings of themselves (as in Chaps. IX. to XI.) require the eyes to be put in profile and the body coloured reddish-brown to represent the race to us. None felt more strongly than the

Fig. 31.—Goldi (Amur).

Egyptian of ancient Thebes that among the chief distinctions between the races of mankind were the complexion and feature which separated him from the Æthiopian on the one hand and the Assyrian or Israelite on the other.

Turning to another district of the world, the Mongoloid type of man has its best-marked representatives on the vast steppes of northern Asia. Their skin is brownish-yellow, their hair of the head black, coarse, and long, but face-hair scanty. Their skull is characterized by

breadth, projection of cheek-bones, and forward position of the outer edge of the orbits, which, as well as the slightness of brow-ridges, the slanting aperture of the eyes, and the snub-nose, are observable in Figs. 30 and

FIG. 32.—Siamese actresses.

31, and in Fig. 12 *d*. The Mongoloid race is immense in range and numbers. The great nations of south-east Asia show their connexion with it in the familiar complexion and features of the Chinese and Japanese. Figs. 32, 33, 34 are portraits from Siam, Cochin-China, and Corea. In his wide migrations over the world, the Mongoloid, through change of climate and life, and still

farther by intermarriage with other races, loses more and more of his special points. It is so in the south-east, where in China and Japan the characteristic breadth of skull is lessened. In Europe, where from remotest antiquity hordes of Tatar race have poured in, their descendants have often preserved in their languages, such as Hungarian and Finnish, clearer traces of their Asiatic home than can be made out in their present types of complexion and feature. Yet the Finns have not

FIG. 33.—Cochin-Chinese.

lost the race-differences which mark them off from the Scandinavians, and the stunted Lapps still more resemble their Siberian kinsfolk, who wander like them with their reindeer on the limits of the Arctic regions. The purest Lapp type is now found among the Norwegian Mountain Lapps (Fjeld-Finns), Figs. 35 and 36.

In pursuing beyond this point the examination of the races of the world, the problem becomes more obscure. On the Malay peninsula, at the extreme south-east corner of Asia, appear the first members of the Malay race, seemingly a distant branch of the Mongoloid, which spreads over Sumatra, Java, and other islands of the

Eastern Archipelago. Figs. 37 and 38 give portraits of the more civilized Malays, while Fig. 39 shows the Dayaks of Borneo, who represent the race in a wilder and perhaps less mixed state. From the Malay Archipelago there stretch into the Pacific the island ranges, first of Micro-

FIG. 34.—Coreans.

nesia and then of Polynesia, till we reach Easter Island to the east and New Zealand to the south. The Micronesians and Polynesians show connexion with the Malays in language, and more or less in bodily make. But they are not Malays proper, and there are seen among them high faces, narrow noses, and small mouths which remind us of the European face, as in the Micronesian,

FIGS. 35 and 36.—Norwegian Mountain Lapps (so-called Fjeld-Finns).

Fig. 38.—Malays.

Fig. 37.—Malays.

Fig. 40, who stands here to represent this varied group of peoples. The Maoris are still farther from being pure Malays, as is seen by their more curly hair, often prominent and even aquiline noses. It seems likely that an Asiatic race closely allied to Malays may have spread over the South Sea Islands, altering their special type by crossing with the dark Melanesians, so that now the populations of different island groups often vary much in appearance. This race of sailors even found their way to Madagascar, where their descendants have more or less blended with a population from the continent of Africa.

Turning now to the double continent of America, we find in this New World a problem of race remarkably different from that of the Old World. The traveller who should cross the earth from Nova Zemlya to the Cape of Good Hope or Van Diemen's Land would find in its various climates various strongly-marked kinds of men, white, yellow, brown, and black. But if Columbus had surveyed America from the Arctic to the Antarctic regions, he would have found no such extreme unlikeness in the inhabitants. Apart from the Europeans and Africans who have poured in since the fifteenth century, the native Americans in general might be, as has often been said, of one race. Not that they are all alike, but their differences in stature, form of skull, feature, and complexion, though considerable, seem variations of a secondary kind. It is not as if several races had formed each its proper type in its proper region, but as if the country had been peopled by migrating tribes of a ready-made race, who had only to spread and acclimatize themselves over both tropical and temperate zones, much as the European horses have done since the time of Columbus, and less perfectly the white men themselves. The race to which most anthropologists refer the native Americans is the Mongoloid of East Asia, who are capable of accommodating themselves to the extremest climates, and who by the form of skull, the light-brown skin, straight black hair, and black eyes, show considerable agreement with the American tribes. Figs. 41 and 42 represent the wild hunting-tribes of North America in one of the finest forms now existing, the Colorado Indians, while in Fig. 43 the Cauixana Indians may stand as examples of the rude and sluggish forest-men of Brazil. While tribes of America and Asia may thus be of one original stock, we must look cautiously at theories as to the

FIG. 39.—Dayaks.

ocean and island routes by which Asiatics may have migrated to people the New World. It is probable that

FIG. 40.—Kingsmill Islander.

man had appeared there, as in the Old World, in an earlier geological period than the present, so that the first kinship between the Mongols and the North American Indians may go back to a time when there was no ocean between them. What looks like later

FIG. 41.—Colorado Indian (North America).

communication between the two continents is that the stunted Eskimo with their narrow roof-topped skulls may be a branch of the Japanese stock, while there are signs of the comparatively civilized Mexicans and Peruvians having in some way received arts and ideas from Asiatic nations.

FIG. 42.—Colorado Indian (North America).

We come last to the white men, whose nations have all through history been growing more and more dominant intellectually, morally, and politically on the earth. Though commonly spoken of as one variety of mankind, it is plain that they are not a single uniform race, but a varied and mixed population. It is a step toward

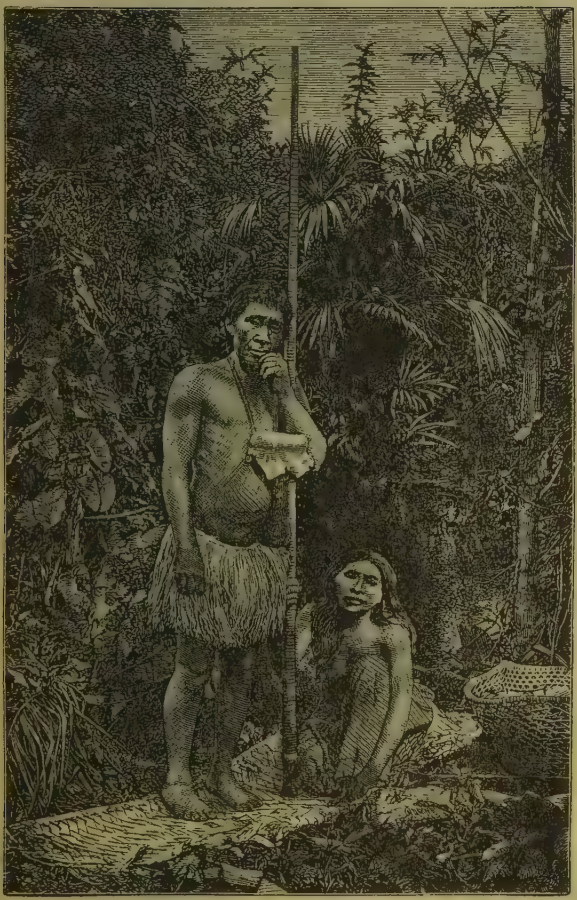


FIG. 43.—Cauixana Indians (South America).

classing them to separate them into two great divisions, the dark-whites and fair-whites (melanochroi, xanthochroi). Ancient portraits have come down to us of the

dark-white nations, as Assyrians, Phœnicians, Persians, Greeks, Romans; and when beside these are placed moderns such as the Andalusians, and the dark Welshmen or Bretons, and people from the Caucasus, it will be evident that the resemblance running through all these can only be in broad and general characters. They

FIG. 44.—Georgians.

have a dusky or brownish-white skin, black or deep brown eyes, black hair, mostly wavy or curly; their skulls vary much in proportions, though seldom extremely broad or narrow, while the profile is upright, the nose straight or aquiline, the lips less full than in other races. Rather for form's sake than for a real type of the dark-whites, a group of Georgians are shown in Fig. 44. Opposite them Fig. 45, a group of Swedes, somewhat

better represents the fair-whites, whose transparent skin, flaxen hair, and blue eyes may be seen as well, though not as often, in England as in Scandinavia or North Germany. The earliest recorded appearance of fair whites may be in the paintings where Egyptian artists represent with yellowish-white skin and blue eyes certain

FIG. 45.—Swedes.

natives of North Africa, a district where remnants of blonde tribes are still known. These fair Libyans, as well as the fair red-haired people who appear about Syria, and are known to us as forming a type among the Jews, may perhaps be connected in race with the fair nations who were already settled over the north of Europe when the classic writers begin to give accounts of its barbarous inhabitants, from the Goths northward to the dwellers in Thule. The intermarriage of the dark

and fair varieties which has gone on since these early times, has resulted in numberless varieties of brown-haired people, between fair and dark in complexion. But as to the origin and first home of the fair and dark races themselves, it is hard to form an opinion. Language does much toward tracing the early history of the

Fig. 46.—Gypsy.

white nations, but it does not clear up the difficulty of separating fair-whites from dark-whites. Both sorts have been living united by national language, as at this day German is spoken by the fair Hanoverian and the darker Austrian. Among Keltic people, the Scotch Highlanders often remind us of the tall red-haired Gauls described in classical history, but there are also passages

which prove that smaller darker Kelts like the modern Welsh and Bretons existed then as well. As a help in clearing up this problem, which so affects our own ancestry, Huxley suggests that the fair-whites were the original stock, and that these crossing with the brown races of the far south may have given rise to the various kinds of dark-whites. However this may be, such mixture of the white and brown races seems indeed to have largely formed the population of countries where they meet. The Moors of North Africa, and many so-called Arabs who are darker than white men, may be thus accounted for. It is thus that in India millions who speak Hindu languages show by their tint that their race is mixed between that of the Aryan conquerors of the land and its darker indigenes. An instructive instance of this very combination is to be seen in the Gypsies, low-caste wanderers who found their way from India and spread over Europe not many centuries since. Fig. 46, a Gypsy woman from Wallachia, is a favourable type of these latest incomers from the East, whose broken-down Hindu dialect shows that part of their ancestry comes from our Aryan forefathers, while their complexion, swarthiest in the population of our country, marks also descent belonging to a darker zone of the human species.

Thus to map out the nations of the world among a few main varieties of man, and their combinations, is, in spite of its difficulty and uncertainty, a profitable task. But to account for the origin of these great primary varieties or races themselves, and exactly to assign to them their earliest homes, cannot be usefully attempted in the present scantiness of evidence. If man's first appearance was in a geological period when the distribution of land and sea and the climates of the earth were not as now, then on both sides of the globe, outside the present tropical zones, there were regions whose warmth and luxuriant vegetation would have favoured man's life with least need of civilized arts, and whence successive waves of population may have spread over cooler climates. It may perhaps be reasonable to imagine as latest-formed the white race of the temperate region, least able to bear extreme heat or live without the appliances of culture, but gifted with the powers of knowing and ruling which give them sway over the world.

CHAPTER IV

LANGUAGE

Sign-making, 92—Gesture-language, 92—Sound-gestures, 96—Natural Language, 98—Utterances of Animals, 98—Emotional and Imitative Sounds in Language, 100—Change of Sound and Sense, 102—Other expression of Sense by Sound, 102—Children's Words, 103—Articulate Language, its relation to Natural Language, 103—Origin of Language, 104.

THERE are various ways in which men can communicate with one another. They can make *gestures*, utter *cries*, speak *words*, draw *pictures*, write *characters* or *letters*. These are signs of various sorts, and to understand how they do their work let us begin by looking at such signs as are most simple and natural.

When for any reason people cannot talk together by word of mouth, they take to conversing by gestures, in what is called dumb show or pantomime. Every reader of this has been able from childhood to carry on conversation in this way, more or less cleverly. Imagine a simple case. A boy opens the parlour door, his brother sitting there beckons to him to be quiet for his father is asleep; the boy now intimates by signs that he has come for the key of the box, to which his brother answers by other signs that it is in the pocket of his coat hanging in the hall, concluding with a significant gesture to be off and shut the door quietly after him. This is the *gesture-language* as we all know how to use it. But to see what a full and exact means of communication it may be worked up to, it should be watched in use among the deaf-and-dumb, who have to depend so much upon it. To give an idea how far gestures can be made to do the work of spoken words, the signs may be described in which a deaf-and-dumb man once told a child's story in presence of the writer of this account. He began by moving his hand, palm down, about a yard from the ground, as we do to show the height of a child—this meant that it was a child he was thinking of. Then he tied an imaginary pair of bonnet-strings under his chin (his usual sign for female), to make it understood that

the child was a little girl. The child's mother was then brought on the scene in a similar way. She beckons to the child and gives her twopence, these being indicated by pretending to drop two coins from one hand into the other; if there had been any doubt as to whether they were copper or silver coins, this would have been settled by pointing to something brown, or even by one's contemptuous way of handling coppers which at once distinguishes them from silver. The mother also gives the child a jar, shown by sketching its shape with the forefingers in the air, and going through the act of handing it over. Then by imitating the unmistakable kind of twist with which one turns a treacle-spoon, it is made known that it is treacle the child has to buy. Next, a wave of the hand shows the child being sent off on her errand, the usual sign of walking being added, which is made by two fingers walking on the table. The turning of an imaginary door-handle now takes us into the shop, where the counter is shown by passing the flat hands as it were over it. Behind this counter a figure is pointed out; he is shown to be a man by the usual sign of putting one's hand to one's chin and drawing it down where the beard is or would be; then the sign of tying an apron round one's waist adds the information that the man is the shopman. To him the child gives her jar, dropping the money into his hand, and moving her forefinger as if taking up treacle, to show what she wants. Then we see the jar put into an imaginary pair of scales which go up and down; the great treacle-jar is brought from the shelf and the little one filled, with the proper twist to take up the last trickling thread; the grocer puts the two coins in the till, and the little girl sets off with the jar. The deaf-and-dumb story-teller went on to show in pantomime how the child, looking down at the jar, saw a drop of treacle on the rim, wiped it off with her finger and put the finger in her mouth, how she was tempted to take more, how her mother found her out by the spot of treacle on her pinafore, and so forth.

The student anxious to master the principles of language will find this gesture-talk so instructive that it will be well to explain its working more closely. The signs used are of two kinds. In the first kind things actually present are shown. Thus if the deaf-mute wants to mention "hand" or "shoe," he touches his own hand or shoe. Where a speaking man would say "I," "thou," "he," the deaf-mute simply points to

himself and the other persons. To express "red" or "blue" he touches the inside of his own lip or points to the sky. In the second kind of signs ideas are conveyed by imitation. Thus pretending to drink may mean "water," or "to drink," or "thirsty." Laying the cheek on the hand expresses "sleep" or "bedtime." A significant jerk of the whip-hand suggests either "whip," or "coachman," or "to drive," as the case may be. A "lucifer" is indicated by pretending to strike a match, and "candle" by the act of holding up the forefinger like a candle and pretending to blow it out. Also in the gesture-language the symptoms of the temper one is in may be imitated, and so become signs of the same temper in others. Thus the act of shivering becomes an expressive sign for "cold"; smiles show "joy," "approval," "goodness," while frowns show "anger," "disapproval," "badness." It might seem that such various meanings to one sign would be confusing, but there is a way of correcting this, for when a single sign does not make the meaning clear others are brought in to supplement it. Thus if one wants to express "a pen," it may not be sufficient to pretend to write with one, as that might be intended for "writing" or "letter," but if one then pretends to wipe and hold up a pen, this will make it plain that the pen itself is meant.

The signs hitherto described are self-expressive, that is, their meaning is evident on the face of them, or at any rate may be made out by a stranger who watches their use. Of such self-expressive or natural signs, the gesture-language mostly consists. But where deaf-mutes live together, there come into use among them signs which a stranger can hardly make out until it is explained to him how they arose. They will, for instance, mention one another by nickname-signs, as when a boy may be referred to by the sign of sewing, which on inquiry proves to have been given him because his father was a tailor. Such signs may be very far-fetched; for instance, at the Berlin Deaf-and-dumb Institution, the sign of chopping off a head means a Frenchman, and on inquiry it appears that the children, struck by reading of the death of Louis XVI. in the history-book, had fixed on this as a sign-name for the whole nation. But to any new child who learnt these signs without knowing why they were chosen, they would seem artificial.

Next to studying the gesture-language among the deaf-and-dumb, the most perfect way of making out its

principles is in its use by people who can talk but do not understand one another's language. Thus the celebrated sign-languages of the American prairies, in which conversation is carried on between hunting-parties of whites and natives, and even between Indians of different tribes, are only dialects (so to speak) of the gesture-language. Thus "water" is expressed by pretending to scoop up water in one's hand and drink it, "stag" by putting one's thumbs to one's temples and spreading out the fingers. There is a great deal of variety in the signs among particular tribes, but such a way of communication is so natural all the world over that, when outlandish people, such as Laplanders, have been brought to be exhibited in our great cities, they have been comforted in their loneliness by meeting with deaf-and-dumb children, with whom they at once fell to conversing with delight in the universal language of signs. Signs to be understood in this way must be of the natural self-expressive sort. Yet here also there are some which a stranger might suppose to be artificial, till he learnt that they are old signs which have lost their once plain intention. Thus a North American sign for "dog" is to draw one's two first fingers along like poles being trailed on the ground. This seemingly senseless sign really belongs to the days when the Indians had few horses, and used to fasten the tent-poles on the dogs to be dragged from place to place; though the dogs no longer have to do this, custom keeps up the sign.

It has to be noticed that the gesture-language by no means matches, sign for word, with our spoken language. One reason is that it has so little power of expressing abstract ideas. The deaf-mute can show particular ways of making things, such as building a wall or cutting out a coat, but it is quite beyond him to make one sign include what is common to all these, as we use the abstract term to "make." Even "in" and "out" must be expressed in some such clumsy way as by pretending to put the thing talked of in, and take it out. Next let us compare an English sentence with the signs by which the same meaning would be expressed among the deaf-and-dumb. It will at once be seen that many words we use have no signs at all corresponding to them. Thus when we should say in words, "*The* hat *which* I left on *the* table *is* black," this statement can be practically conveyed in gestures, and there will be signs for what we may call the "real" words, such as *hat, leave, black.*

But for what may be called the "grammatical" words, *the, which, is,* there will be no signs, for the gesture-language has none. Again, grammars lay down distinctions between substantives, adjectives, and verbs. But these distinctions are not to be found in the gesture-language, where pointing to a grass-plot may mean "grass" or "green," and pretending to warm one's hands may suggest "warm" or "to warm oneself," or even "fireplace." Nor (unless where artificial signs have been brought in by teachers) is there anything in the gesture-language to correspond with the inflexions of words, such as distinguish *goest* from *go*, *him* from *he*, *domum* from *domus*. What is done is to call up a picture in the minds of the spectators by first setting up something to be thought about, and then adding to or acting on it till the whole story is told. If the signs do not follow in such order as to carry meaning as they go, the looker-on will be perplexed. Thus in conveying to a deaf-and-dumb child the thought of a green box, one must make a sign for "box" first, and then show, as by pointing to the grass outside, that its colour is "green." The proper gesture-syntax is "box green," and if this order were reversed as it is in the English language, the child might fail to see what grass had to do with a box. Such a sentence as English "cats kill mice" does not agree with the order of the deaf-mute's signs, which would begin by showing the tiny mouse running, then the cat with her smooth fur and whiskers, and lastly the cat's pouncing on the mouse—as it were "mouse cat kill."

This account of the gesture-language will have made it clear to the reader by what easy and reasonable means man can express his thoughts in visible signs. The next step will be to show the working of another sort of signs, namely, the sounds of the human voice in language. Sounds of voice may be spoken as signs to express our feelings and thoughts on much the same principles as gestures are made, except that they are heard instead of being seen.

One kind of sounds used by men as signs consists of emotional cries or tones. Men show pain by uttering groans as well as by distortion of face; joy is expressed by shouts as well as by jumping; when we laugh aloud, the voice and the features go perfectly together. Such sounds are gestures made with the voice, sound-gestures, and the greater number of what are called interjections

are of this class. By means of such cries and tones, even the complicated tempers of sympathy, or pity, or vexation, can be shown with wonderful exactness. Let any one put on a laughing, sneering, or cross face, and then talk, he may notice how his tone of voice follows; the attitude of features belonging to each particular temper acts directly on the voice, especially in affecting the musical quality of the vowels. Thus the speaker's tones become signs of the emotion he feels, or pretends to feel. That this mode of expression is in fact musical, is shown by its being imitated on the violin, which by altering its quality of tone can change from pain to joy. The human voice uses other means of expression belonging to music, such as the contrast of low and loud, slow and quick, gentle and violent, and the changes of pitch, now rising in the scale and now falling. A speaker, by skilfully managing these various means, can carry his hearer's mind through moods of mild languor and sudden surprise, the lively movement of cheerfulness rising to eager joy, the burst of impetuous fury gradually subsiding to calm. We can all do this, and what is more, we do it without reference to the meaning of the words used, for emotion can be expressed and even delicately shaded off in pronouncing mere nonsense-syllables. For instance, the words of an Italian opera in England are to a great part of the audience mere nonsense-syllables serving as a means of musical and emotional expression. Clearly this kind of utterance ought to be understood by all mankind, whatever be the language they may happen to speak. It is so, for the most savage and outlandish tribes know how to make such interjections as *ah! oh!* express by their tone such feelings as surprise, pain, entreaty, threatening, disdain, and they understand as well as we do the growling *ur-r-r!* of anger, or the *puh!* of contempt.

The next class of sounds used as expressive signs are imitative. As a deaf-and-dumb child expresses the idea of a cat by imitating the creature's act of washing its face, so a speaking child will indicate it by imitating its *miaou*. If the two children wish to show that they are thinking of a clock, the dumb one will show with his hand the swinging of the pendulum, while the speaking one will say "*tick-tack*." Here again the sounds are gestures made with the voice, or sound-gestures. In this way an endless variety of objects and actions can be brought to mind by imitating their proper sounds. Not only do

children delight in such vocal imitations, but they have come into ordinary language, as when people speak of the *coo* of the pigeon, the *hee-haw* of the donkey, the *ding-dong* of the bell, and the *rat-tat* of the knocker. It need hardly be said that these ways of expression are understood by mankind all the world over.

Now joining gesture-actions and gesture-sounds, they will form together what may be called a Natural Language. This natural language really exists, and in wild regions even has some practical value, as when a European traveller makes shift to converse in it with a party of Australians round their camp-fire, or with a Mongol family in their felt tent. What he has to do is to act his most expressive mimic gestures, with a running accompaniment of exclamations and imitative noises. Here then is found a natural means of intercourse, much fuller than mere pantomime of gestures only. It is a common language of all mankind, springing so directly from the human mind that it must have belonged to our race from the most remote ages and most primitive conditions in which man existed.

Here a very interesting question arises, on which every student has the means of experimenting for himself. How far are the communications of the lower animals, by their actions and sounds, like this natural language of mankind? Every one who attends to the ways of beasts and birds is sure that many of their movements and cries are not made as messages to one another, but are merely symptoms of the creature's own state of mind; for instance, when lambs frisk in the meadow, or eager horses paw in the stable, or beasts moan when suffering severe pain. Animals do thus when not aware that any other creature is present, just as when a man in a room by himself will clench his fist in anger, or groan in pain, or laugh aloud. When gestures and cries serve as signals to other creatures, they come nearer to real signs. The lower animals as well as man do make gestures and cries which act as communications, being perceived by others, as when horses will gently bite one another to invite rubbing, or rabbits stamp on the ground and other rabbits answer, and birds and beasts plainly call one another, especially males and females at pairing-time. So distinct are the gestures and cries of animals under different circumstances that by experience we know their meaning almost certainly. Human language does not answer its purpose more perfectly than the

hen's cluck to call her chickens, or the bellow of rage with which the bull, tossing his head, warns off a dog near his paddock. As yet, however, no observer has been able to follow the workings of mind even in the dog that jumps up for food and barks for the door to be opened. It is hard to say how far the dog's mind merely associates jumping up with being fed, and barking with being let in, or how far it forms a conception like ours of what it is doing and why it does it. Anyhow, it is clear that the beasts and birds go so far in the natural language as to make and perceive gestures and cries as signals. But a dog's mind seems not to go beyond this point, that a good imitation of a mew leads it to look for a cat in the room; whereas a child can soon make out from the nurse saying *miaou* that she means something about some cat, which need not even be near by. That is, a young child can understand what is not proved to have entered into the mind of the cleverest dog, elephant, or ape, that a sound may be used as the sign of a thought or idea. Thus, while the lower animals share with man the beginnings of the natural language, they hardly get beyond its rudiments, while the human mind easily goes on to higher stages.

In describing the natural language of gestures and exclamations, we have as yet only looked at it as used alone where more perfect language is not to be had. It has now to be noticed that fragments of it are found in the midst of ordinary language. A people may speak English, or Chinese, or Choctaw, as their mother-tongue, but nevertheless they will keep up the use of the expressive gestures and interjections and imitations which belong to natural language. Mothers and nurses use these in teaching little children to think and speak. It is needless to print examples of this nursery talk, for unless our readers' minds have already been struck by it they are not likely to study philology to much purpose. In the conversation of grown people, the self-expressive or natural sounds become more scanty, yet they are real and unmistakable, as the following examples will serve to show.

As for gestures, many in constant use among our own and other nations must have come down from generation to generation since primitive ages of mankind, as when the orator bows his head, or holds up a threatening hand, or thrusts from him an imaginary intruder, or points to the sky, or counts his friends or enemies on his fingers.

Next, as to emotional sounds, a variety of these is actually used in every language. For instances, a few may be cited from among the interjections set down in grammars :

English—*ah ! oh ! ugh ! foh ! ha ! ha ! tut !* (t-t) *sh !*
Sanskrit—*aho !* (surprise), *âha !* (reproach), *um !* (vexation).
Malay—*eh !* (triumph), *weh !* (compassion), *chih !* (dislike).
Galla—*o ! wayo !* (sorrow), *mê !* (entreaty).
Australian—*náh !* (surprise), *pooh !* (contempt).

As for imitative words, all languages of mankind, ancient and modern, savage and civilized, contain more or less of them, and any English child can see how the following set of animals and instruments are named by appropriate sound :—

Ass = *eō* (Egyptian).
Crow = *kâka* (Sanskrit).
Cat = *mau* (Chinese).
Nightingale = *bulbul* (Persian).
Hoopoe = *upupa* (Latin).
Rattlesnake = *shi-shi-gwa* (Algonquin).
Fly = *bumberoo* (Australian).

Drum = *dundu* (Sanskrit).
Flute = *ulule* (Galla).
Whistle = *pipit* (Malay).
Bell = *kwa-lal-kwa-lal* (Yakama).
Blow-tube = *pub* (Quiché).
Gun = *pung* (Botokudo).

Such words are always springing up afresh in dialect or slang; for instance, English *pop*, meaning ginger-beer; German *gaggele*, an egg, from the cackle of the hen as she laid it; French " maître *fifi*," a scavenger (as it were " master *fie-fie* "). In the same way many actions are expressed by appropriate sounds. Thus in the Tecuna language of Brazil the verb to sneeze is *haitschu*, while the Welsh for a sneeze is *tis*. In the Chinuk jargon the expressive sound *humm* means to stink, and the drover's *kish-kish* becomes a verb meaning to drive horses or cattle. It is even possible to find a whole sentence made with imitative words, for the Galla of Abyssinia, to express " the smith blows the bellows," says, *tumtun bufa bufti*, much as an English child might say " the *tumtum puffs* the *puffer*." Such words being taken direct from nature, it is to be expected that people of quite different language should sometimes hit on nearly the same imitations. Thus the Ibo language of West

Africa has the word *okoko* for the bird we call a *cock*. The English verbs to *pat* and to *bang* seem to come from imitations of sound, much the same being found elsewhere; as when the Japanese say *pata-pata* to express the sound of flapping or clapping, and the Yoruba negroes have the verb *gbang*, to beat.

Students whose attention is once directed to this class of self-expressive words will notice them at a glance in each fresh language they master. It takes more careful observation to trace them when the sound has been transferred by the process of metaphor (*i.e.* carrying over) to some new meaning not close to the original sense, but there are plenty of clear cases to choose illustrations from. In the Chinuk jargon of the West Coast of America, a tavern is called a "*heehee*-house," a term which puzzles a foreigner till he understands that among the people who speak this curious dialect the imitative word *heehee* signifies not only laughter but the amusement which causes it, so that the term in fact means "amusement-house." It might seem difficult to hit upon an imitative word to denote a courtier, but the Basuto of South Africa do this perfectly; they have a word *ntsi-ntsi*, which means a fly, being, indeed, an imitation of its buzz, and they simply transfer this word to mean also the flattering parasite who buzzes round the chief like a fly round meat. These instances from uncivilized languages are like those which appear among the most polished nations, as when we English take the imitative verb to *puff* from its proper sense of blowing, to express the idea of inflated, hollow praise. Now if the pronunciation of such words becomes changed, their origin may be only recognized by old records happening to preserve their first sound. Thus when English *woe* is traced back to Anglo-Saxon *wá*, it is found to be an actual groan turned (like German *weh*) into a substantive expressing sorrow or distress. So an Englishman would hardly guess from the present pronunciation and meaning of the word *pipe*, what its origin was; yet when he compares it with the Low Latin *pipa*, French *pipe*, pronounced more like our word *peep*, to chirp, and meaning such a reed-pipe as shepherds played on, he then sees how cleverly the very sound of the musical pipe has been made into a word for all kinds of tubes, such as tobacco-pipes and water-pipes. Words like this travel like Indians on the war-path, wiping out their footmarks as they go. For all we know, multitudes of our

ordinary words may have thus been made from real sounds, but have now lost beyond recovery the traces of their first expressiveness.

We have not yet come to the end of the intelligible ways in which sound can be made to express sense. When people want to show alteration in the meaning of a word, it is enough to make some change in its pronunciation. It is not difficult to see how, in the Wolof language of West Africa, where *dagou* means to walk, *dâgou* signifies to walk proudly; *dagana* means to ask humbly, but *dagâna* to demand. In the Mpongwe language the meaning can be actually reversed by changing the pronunciation: as "mi *tonda*," I love, but "mi *tonda*," I love not. The English reader can manage to do much the same tricks by varying the tones of his own verbs *walk*, *ask*, *love*. This process of expressing difference of sense by difference of sound may be carried much farther. An instructive instance of clear symbolism by sound is to be found in a word coined by the chemist Guyton de Morveau. In his names for chemical compounds he had already the term *sulfate* (made on a Latin pattern like *sulphuratus*), but afterwards he wanted a word to denote a sulphur-salt of different proportions, and thereupon, to express the fact that there was an alteration, he changed a vowel and made the term *sulfite*. He perhaps did not know that he was here resorting to a device found in many rude languages. Thus in Manchu, contrast of sound serves to indicate difference of sex, *chacha* meaning "male," and *cheche* "female," *ama* "father" and *eme* "mother." So distances are often expressed by altering the vowel, as in Malagasy *ao* means a little way off, *eo* still nearer, *io* close at hand. In this way it is easy to make sets of expressive personal pronouns; as in the Tumal language *ngi* "I," *ngo* "thou," *ngu* "he." Another well-known process is reduplication or doubling, which serves a number of different purposes. It shows repetition or strengthening of meaning, as where the Polynesian *aka* "to laugh," becomes *akaaka* "to laugh much," while *loa* "long," becomes *lololoa* "very long." Our words *haw-haw* and *bonbon* are like these. It is also easy to form plurals by reduplication, as Malay *orang* "man," *orang-orang* "men"; Japanese *fito* "man," *fito-bito* "men." Among the kinds of reduplication best known to us is that which marks tenses in verbs, like *didōmi* and *tetupha* in Greek, *momordi* in Latin.

These clever but intelligible devices for making the

sound follow the sense show how easily man gets beyond mere imitation. Language is one branch of the great art of sign-making or sign-choosing, and its business is to hit upon some sound as a suitable sign or symbol for each thought. Whenever a sound has been thus chosen there was no doubt a reason for the choice. But it did not follow that each language should choose the same sound. This is well shown by the peculiar class of words belonging to children's language or baby-language, of which the word *baby* itself is one. These words are made up all over the world from the few simple syllables which children first utter, chosen almost anyhow to express the nursery ideas of mother, father, nurse, toy, sleep, &c. Thus while we have our way of using *papa* and *mama*, the Chilians say *papa* for "mother," and the Georgians *mama* for "father," while in various languages *dada* may mean "father," "cousin," "nurse"; *tata* "father," "son," "good-bye!" Such children's words often find their way into the language of grown people, and any slight change makes them look like ordinary words. Thus in English one might hardly suspect *pope* and *abbot* of having their origin in baby-words, yet this is evident when they are traced back to Latin *papa* and Syriac *abba*, both meaning "father."

These nursery words have already come beyond the "natural language" of self-expressive gestures and sounds. From its simple and clear facts we thus pass to the more difficult and obscure principles of "articulate language." On examining English, or any other of the thousand tongues spoken in the world, it is found that most of the words used show no such connexion between sound and sense as is so plain in the natural or self-expressive words. To illustrate the difference, when a child calls a pocket timepiece a *tick-tick*, this is plainly self-expressive. But when we call it a *watch*, this word does not show why it is used. It is known that the instrument had its name from telling the hours like a *watch*-man, whose name denotes his duty to *watch*, Anglo-Saxon *wæccan*, from *wacan*, to move, *wake*; but here explanation comes to a stop, for no philologist has succeeded in showing why the syllable *wac* came to denote this particular idea. Or if the same child call a locomotive engine a *puff-puff*, this is self-expressive. Grown people call it an *engine*, a term which came through French from Latin *ingenium*, which meant that which is "in-born," thence natural ability or genius, thence an effort of genius, invention or contrivance, and

thence a machine. By going farther back and taking the Latin word to pieces, it is seen that the syllables *in* and *gen* convey the ideas of "in" and "birth"; but here again etymology breaks down, for why these sounds were chosen for these meanings no one knows. Thus it is with at least nine-tenths of the words in dictionaries; there is no apparent reason why the word *go* should not have signified the idea of coming, and the word *come* the idea of going; nor can the closest examination show cause why in Hebrew *chay* means live, and *mêth* dead, or why in Maori *pai* means good and *kino* bad. It is maintained by some philologists that emotional and imitative sounds such as have been described in this chapter are the very source of all language, and that although most words now show no trace of such origin, this is because they have quite lost it in the long change of pronunciation and meaning they have gone through, so that they are now become mere symbols, which children have to learn the meaning of from their teachers. Now all this certainly has taken place, but it would be unscientific to accept it as a complete explanation of the origin of language. Besides the emotional and imitative ways, several other devices have here been shown in which man chooses sounds to express thoughts, and who knows what other causes may have helped? All we have a right to say is that, from what is known of man's ways of choosing signs, it is likely that there was always some kind of fitness or connexion which led to each particular sound being taken to express a particular thought. This seems to be the most reasonable opinion to be held as to the famous problem of the Origin of Language.

At the same time, what little is known of man's ways of making new words out of suitable sounds, is of great importance in the study of human nature. It proves that, so far as language can be traced to its actual source, that source does not lie in some lost gifts or powers of man, but in a state of mind still acting, and not above the level of children and savages. The origin of language was not an event which took place long ago once for all, and then ceased entirely. On the contrary, man still possesses, and uses when he wants it, the faculty of making new original words by choosing fit and proper sounds. But he now seldom puts this faculty to serious use, for this good reason, that whatever language he speaks has its stock of words ready to furnish an expression for almost every fresh thought that crosses his mind.

CHAPTER V

LANGUAGE—(*continued*)

Articulate Speech, 105—Growth of Meanings, 106—Abstract Words, 107—Real and Grammatical Words, 108—Parts of Speech, 109—Sentences, 110—Analytic Language, 110—Word Combination, 111—Synthetic Language, 111—Affixes, 112—Sound-change, 113—Roots, 114—Syntax, 115—Government and Concord, 116—Gender, 118—Development of Language, 119.

A SENTENCE being made up of its connected sounds as a limb is made up of its joints, we call language *articulate* or "jointed," to distinguish it from the *inarticulate* or "unjointed" sounds uttered by the lower animals. Such conversation by gestures and exclamations as was shown in the last chapter to be a natural language common to mankind is half-way between the communications of animals and full human speech. Every people, even the smallest and most savage tribe, has an articulate language, carried on by a whole system of sounds and meanings, which serves the speaker as a sort of catalogue of the contents of the world he lives in, taking in every subject he thinks about, and enabling him to say what he thinks about it. What a complicated and ingenious apparatus a language may be, the Greek and Latin grammars sufficiently show. Yet the more carefully such difficult languages are looked into, the more plainly it is seen that they grew up out of earlier and simpler kinds of speech. It is not our business here to make a systematic survey of the structure of languages, such as will be found in the treatises of Max Müller, Sayce, Whitney, and Peile. What we have to attend to is that many of the processes by which languages have been built up are still to be found at work among men, and that grammer is not a set of arbitrary rules framed by grammarians, but the result of man's efforts to get easier, fuller, and exacter expression for his thoughts. It may be noticed that our examples are oftener taken from English than from any other tongue. The reason of this is not merely the convenience of using the most familiar words as instances, but that English is of all existing languages

perhaps the best for explaining the development of language in general. While its words may in great part be traced to high antiquity, its structure has passed through extreme changes in coming down to modern times, and in its present state the language at once keeps up relics of ancient formations and has the freest growth actually going on. Thus, in one way or another, English has something to show in illustration of three out of four of the processes known to have helped in the making of language, at any time and anywhere.

As in the course of ages man's knowledge became wider and his civilization more complex, his language had to keep up with them. Comparatively few and plain expressions had sufficed for his early rude condition, but now more and more terms had to be added for the new notions, implements, arts, offices, and relations of more highly organized society. Etymology shows how such new words are made by altering and combining old ones, carrying on old words from the old state of things to do duty in the new, shifting their meanings, and finding in any new thought some resemblance to an old one that would serve to give it a name. English is full of traces of these ways of word-making and word-shifting. For instance, that spacious stone building is still called, as its rough predecessors were, a *barrack* (that is, hut); in it a *regiment* (that is, a ruling or command) of *soldiers* (that is, paid men) of the *infantry* (that is, lads, who fought on foot) are being *inspected* (that is, looked into); each *company* (that is, those who have bread together) being under a *captain* (that is, head-man) and his *lieutenants* (that is, place-holders). On the front of the building is a *clock*, a machine which keeps on its old name, meaning a bell, from the ages when its predecessor was only a bell on which a watchman struck the hours; in later times were added the *weights*, lumps of metal so called from the weights of the balance, the *pendulum* (or hanger), and what are metaphorically called the *face* and *hands*, for showing on a *scale* (or ladder) the *hours* (or times), divided into *minutes* (or smalls), and then again into *seconds* (or followings). These instances are intentionally not drawn from the depths of etymology, but are taken to show the ordinary ways in which language finds means to supply the new terms of advancing society. It will be worth while to give a few cases showing that the languages of less civilized races do their duty in much the same ways. The Aztecs called a boat

a "water-house" (*acalli*), and thence the censer in which they burnt copal as incense came to be called a "little copal-boat" (*copalacaltontli*). The Vancouver Islanders, when they saw how a screw-steamer went, named it at once *yetseh-yetsokleh*, that is, the "kick-kicker." The Hidatsas of the Missouri till lately had only hard stone for their arrows and hatchets; so when they became acquainted with iron and copper they made names for these metals—*uetsasipisa* and *uetsahisisi*, that is to say, "stone black" and "stone red." The horse, when brought by the white men among peoples who had never seen it, had to be named, and accordingly the Tahitians called it "pig-carry-man," while the Sioux Indians said it was a "magic-dog."

As a help to understand how words have come to express still more difficult thoughts, it is well to remember the contrast between the gesture-language and spoken English (p. 95). It was seen how the deaf-and-dumb fall short of our power of expressing general and abstract ideas. Not that they cannot conceive such ideas at all. They use signs as general terms when they can lay hold of some quality or action as the mark of a whole class. Thus flapping one's arms like wings means any bird, or birds in general, and the sign of legs-four, means beasts, or quadrupeds in general. The pretence of pouring something out of a jug expresses the notion of fluid, which they understand, as we do, to comprise water, tea, quicksilver; and they probably have, though more dimly than we, such other abstract notions as the whiteness common to all white things, and the length, breadth, and thickness which all solid objects have. But while the deaf-mute's sign must always make us think of the very thing it imitates, the spoken word can shift its meaning so as to follow thought wherever it goes. It is instructive to look at words in this light, to see how, starting from thoughts as plain as those shown by the signs of the American savage, they can come on to the most difficult terms of the lawyer, the mathematician and the philosopher. To us words have become, as Lord Bacon said, counters for notions. By means of words we are enabled to deal with abstract ideas, got by comparing a number of thoughts, but so as only to attend to what they have in common. The reader of this no doubt uses easily, and perhaps correctly, such words as *sort*, *kind*, *thing*, *cause*, to *make*, *be*, *do*, *suffer*. If he will try to get clear to his mind what is actually meant by

these words, that is, what sense they carry with them wherever used, he may teach himself the best lesson he ever learnt, either in language or philosophy. To Englishmen who know no language but their own, these words are indeed, as it were, counters, chosen at random to express thoughts. Having learnt by practice how and where to apply them, they are seldom even conscious of their highly abstract nature. The philologist cannot trace the complete history of them all, but he knows enough to satisfy him that they came out of words easier to understand. As in the Bornu language of Africa, *tando*, to "weave," has become a general verb to "make," and in Hebrew *bârâ*, to "cut" or "hew," has come to be used for the making of the heavens and earth; so our word to *make* may have meant originally to fit, or join. The English word *sort* comes from Latin *sors*, a "lot," through such a set of meanings as allotment, oracle, fate, condition, chance, portion; *kind* meant of one kindred or descent; to *be* may have meant to grow; to *suffer* meant to bear as a burden. It belongs to high metaphysics to talk of the *apprehension* of *ideas*; but these now abstruse words originally meant "catching hold" of "sights." One use of etymology is that it teaches how men thus contrived, from words which expressed plain and easy thoughts, to make terms for more complex and abstruse thoughts. This is the high road along which the human mind has travelled from ignorance to knowledge.

The next contrivance of language to be noticed is the use of "grammatical" words, which serve to connect the "real" words and show what they have to do with one another. This again is well seen by looking at the gesture language (p. 95). If a deaf-and-dumb man wants to convey in gestures "John is come, he has brought the harness of the pony and put it on a bench," he can communicate the sense of this well enough, but he does it by merely giving the real parts, as "John, harness, pony, carry, bench, put." But the articles "a" and "the," the preposition "of," the conjunction "and," the substantive verb "is," and the pronouns "he," "it," are grammatical devices which have not signs in his natural system, and which he does not even learn the meaning of till he is taught to read. Nevertheless, the deaf-mute, if obliged to be very exact in his account, can actually give us a good idea of the way in which we speaking-people have come to use grammatical words. Though he cannot

intimate that it is *a* bench, he can hold up one finger to show that it is *one* bench; though he has no sign for *the* pony, he can as it were point it out so as to show it is *that* pony; instead of expressing *of* the pony as we do, he can go farther by pretending to take the harness *off* the pony. Now English etymology often shows that our grammatical words were made in very much this way out of real words; *an* or *a* was originally the numeral "one," still Scotch *ane*; *the* is of the same family of words with *that* and *there*; *of* is derived from the same source with *off*; the conjunction *and* may be traced back to the more real meaning of "further" or "thereto"; the verb to *have* has become a mere auxiliary in "I *have* come," yet it keeps its old full sense of to hold or grasp, when one man seizing another cries "I *have* him!" When an Englishman says he "*stands* corrected," this does not mean that he is on his legs, but the verb has sunk into a grammatical auxiliary, now conveying little more than the passive sense he "is corrected." It is curious to notice pronouns being thus formed from more real words. As the deaf-mute simply points with his finger to express "I" and "thou," so the Greenlander's *uvanga* = "I," *ivdlit* = "thou," are plainly derived from *uv* = "here," *iv* = "there." Quite a different device appears in Malay, where *âmba* = "slave" is used as a pronoun "I," and *tuwan* = "lord" as a pronoun "thou." How this came to pass is plainly shown by Hebrew, in such phrases as are translated in the English Bible, "*thy servant* saith," "*my lord* knoweth"; these terms are on the road to become mere personal pronouns meaning "I" and "thou," as in the Malay they actually have done. An exact line cannot be drawn between real and grammatical words in English or any other language, for the good reason that words pass so gradually from the real into the grammatical stage, that the same word may be used in both ways. But though the distinction is not an exact one, it should be noticed attentively. Any one who will try to tell an intelligible story in English real words only, without the help of the grammatical particles which are the links and hinges of the sentence, will see how the use of grammatical words was one of the greatest moves made by man in the formation of articulate speech.

Philology goes still further in explaining how the complicated devices of grammar arose from simple beginnings. The distinction of "parts of speech," familiar to us in a

highly-developed state from the Greek and Latin grammars, is a useful means of showing the relations among the several thoughts talked of in the sentence. But it is possible to do without parts of speech, and it is not to be supposed that they existed in the earliest forms of language. In the gesture language it has been already noticed that there is no such distinction even between noun and verb. In classical Chinese, *thwan* means round, a ball, to make round, to sit round, and so on; *ugan* means quiet, quietly, to quiet, to be quiet, &c. We English can quite enter into this, for our language has so far dropped the ancient inflexions as to break up distinctions between parts of speech in almost Chinese fashion, using a word either as substantive, adjective, or verb, as the people's *quiet*, a *quiet* people, to *quiet* the people, and without scruple turning a verb into a substantive, as a workmen's *strike*, or a substantive into a verb, as to *horse* a coach. The very formation of new parts of speech may be seen going on, as where Chinese shows how prepositions may be made out of nouns or verbs. Thus "kuo *chung*," that is "kingdom *middle*," is used to mean "in the kingdom," and "sha jin *i* thing," that is, "kill man *use* stick," expresses "to kill a man *with* a stick." So an African language, the Mandingo, may be caught in the act of making prepositions out of the nouns *kang*, "neck," and *kono*, "belly," when they say "put table *neck*" for "*on* the table," and "house *belly*" for "*in* the house."

We have next to look at the way in which language grows by combining its words to form new ones. To see this, words have to be noticed not as they stand by themselves, but as they come together in actual speaking. Language consists of sentences, and a sentence is made up of words, each word being a distinct spoken sound carrying a distinct meaning. The simplest notion of a sentence may be had from such a language as Chinese, where it can be taken apart into words which are each a single syllable. Thus *kou chi shi jin sse*, that is "dog sow eat man food" means that dogs and sows eat the food of men. The class of languages which can be taken to pieces in this perfect way are called *analytic* or isolating. In most languages of the world, however, which are more or less *synthetic* or compounding, the tendency is not so strong to keep words separate, and they are apt to attach themselves together. To bring clearly before our minds how the joining or compounding of words

takes place, let us notice rather more closely than usual one of our English sentences. On listening, it will appear that the spoken words have not really breaks between them as in writing, but the syllables run on continuously till the speaker pauses, and what marks a word is, not its being really separated, but its having an emphasis, or stress (as it is called by Mr. Sweet). Now, from time to time, certain words may be noticed becoming actually fixed together. How this joining gradually takes place we sometimes try to show by writing them differently, as *hard ware, hard-ware, hardware*; or *steam ship, steam-ship, steamship*. On listening to such joined words, it is found that one of the two has lost its stress, the whole compound having now but one stress. This is how in talking English our minds give a sign by our voices that two words have become one. The next step is when the sound of one of the part-words becomes slurred or broken down, as in the end-words of *waterman, wrongful*. Or both the simple words may have broken down, as in *boatswain* and *coxswain*, where writing keeps up the original meaning of the *swain* in charge of the *boat* or *cock*-boat, but in actual speaking the words have shrunk to what may be spelt *bōsun, coxun*. Now this process of forming a new word by (so to speak) welding together two or more old ones, is one of the chief acts by which word-makers, ancient and modern, have furnished themselves with more manageable terms, which again as the meanings of the separate parts were less cared for, were cut shorter in speaking. When this has not gone too far, philologists can still get back to the original elements of such words, discerning the *fourteen night* in *fortnight*; the *unus* and *decem* in *undecim*, shrunk still farther in French *onze*; the *jus, dico*, in Latin *judex*, which in English comes down to *judge*.

As examples how word-compounding goes on in unfamiliar tongues, may be taken the Malay term for "arrow," which is *anak-panah*, or "child-(of-the)-bow"; and the native Australian term for "unanimous," which is *gurdugynyul*, or "heart-one-come." To show how such compound words become shortened, take the Mandingo word for "sister," *mbadingmuso*, which is made up of *mi bado dingo muso*, meaning "my-mother-child-female." The natives of Vancouver's Island gave to a certain long-bearded Englishman the name *Yakpus*; this appears to have come from *yakhpekukselkous*, made

up of words signifying "long-face-hair-man," which in speaking had been cut down to *yakpus*. No one who did not happen to be told the history of this word could ever have guessed it. This is an important lesson in the science of language, for it is likely that tens of thousands of words in the languages of the world may have come into the state in which we find them by the shortening of long compound words, and when this has been done recklessly as in the last example, and the history lost, all reasonable hope is gone of ever getting back to the original form and meaning. Nor does this process of contraction affect only compound words, but it may act on a whole sentence, fusing it as it were into one word. Here the synthetic or compounding principle reaches its height. As a contrast to the analytic Chinese sentence given at page 110, to show the perfect distinctness of their words, we may take a sentence of an African language to show how utterly that distinctness may be lost. When a Grebo negro wishes to express that he is very angry, he says in his metaphorical way "it has raised a bone in my breast." His full words for expressing this would be *e ya mu kra wudi*, but in speaking he runs them together so that what he actually utters is *yamukroure*. Where such breaking down has gone on unchecked, it is easy to see how the language of a barbaric tribe may alter so much in a few generations as hardly to be recognized. Indeed, any one who will attend to how English words run together in talking may satisfy himself that his own language would undergo rapid changes like those of barbaric tongues, were it not for the schoolmaster and the printer, who insist on keeping our words fixed and separate.

The few examples here given of new words made by compounding old ones may serve to illustrate the great principle that such combination, far from being a mere source of confusion, has been one of the great means of building up language. Especially, one of the great discoveries in modern philology is how grammatical formation and inflexion has partly come about by a kind of word-compounding. It must have seemed to the old scholars a mysterious and arbitrary proceeding that Latin should have fixed upon a set of meaningless affixes to inflect and make into different parts of speech *ago, agis, agit, agere, agens, actum, actor, actio, activus, activè*, &c. But the mystery to some extent disappeared when it was noticed how in modern languages the run-

ning together of words produced something of the kind. Thus the *hood* of *womanhood, priesthood,* which is now a mere grammatical suffix, was in old English a word of itself, *hâd,* meaning form, order, state; and the suffix *-ly* was once the distinct word "like," as is seen by Anglo-Saxon saying cwên-*lic,* "queen-*like,*" where modern English says queen*ly*. In Chaucer's English it is seen how the pronoun *thou* had dwindled into a mere verb-ending,

> "He pokyd Johan, and seyde, Slepist*ow*?
> Herdist*ow* ever slik a sang er now?"

In English the future tense of the verb to give is "I will give," or, colloquially, "I'll give." Here writing separates what speaking joins, but the modern French future tense *donnerai, donneras,* is the verb *donner* with the auxiliary verb *ai, as,* both spoken and written on to it, so that "je donnerai" is a phrase like "I have to give." The plural *donnerons, donnerez,* can no longer be thus taken to pieces, for the remains of the auxiliary verb have passed into meaningless grammatical affixes *ons, ez.* There is reason to suppose that many of the affixes of Greek and Latin grammar arose in this way by distinct words combining together and then shrinking. Not that it would be safe to assert that all affixes came into existence in this particular way. As was pointed out in the last chapter, men wanting to utter a thought are clever enough to catch up in very far-fetched ways a sound to express it. Thus the prefix *ge,* which German uses to make past participles with, seems to have originally signified "with" or "together," which sense it still retains in such words as *gespiele,* "playfellow"; but by a curious shifting of purpose it came to serve as a means of forming participles, as *spielen,* to play, *gespielt,* played. It was so used also in Anglo-Saxon, as *clypian,* to call, *geclypod,* called, which word in its later form *yclept* still keeps up among us a trace of the old grammatical device. Philologists have to keep their eyes open to this power which language-makers have of using sounds for some new purpose they were not intended for. Thus, in English, the change of vowels in *foot, feet,* and in *find, found,* now serves as a means of declining the noun and conjugating the verb. But history happens to show that the vowel change was not originally made with this intention at all. The Anglo-Saxon declension proves that the vowel was not then a sign of number in the noun; it

was singular *fôt, fôtes, fêt,* plural *fêt, fôta, fôtum.* Nor was it a sign of tense in the Anglo-Saxon verb, where the perfect of *findan,* to find, had different vowels in its singular, *ic fand,* I found, and its plural, *we fundon,* we found. It was the later Englishmen who, knowing nothing of the real reasons which brought about the variation of the vowels, took to using them to mark singular from plural, and present from perfect.

It is the work of grammarians in examining any language to take all its combined words to pieces as far as possible. Greek and Latin grammars now teach how to analyse words by stripping off their affixes, so as to get down to the real part or root, which is generally a simple sound expressing a simple notion. A root is best understood by considering it to have been once a separate word, as it would be in such a language as English. Even in languages where the roots seldom appear without some affix attached, they may stand by themselves as imperative, like Latin *dic!* say! Turkish, *sev!* love! But in many languages roots can only be found as imaginary forms, by comparing a group of words and getting at the common part belonging to them all. Thus in Latin it appears from *gnosco, gnotus,* &c., that there must be a root *gno* which carries the thought of knowing. Going on to Greek, there is found in *gignōskō, gnōsis, gnōmē,* &c., the same root *gno* with the same meaning. Turning next to Sanskrit, a similar sound, *jnâ,* appears as the root-form for knowing. In this way, by comparing the whole set of Aryan or Indo-European languages, it appears that there must have been in ancient times a word something like *gna,* meaning to know, which is to be traced not only in Sanskrit, Greek, and Latin, but in many other languages of the family, as Russian *znat,* English *know.* A few more such Aryan roots, which the reader recognizes at once in well-known languages, are *sta,* to stand, *sad,* to sit, *ga,* to go, *i,* to go, *ma,* to measure, *da,* to give, *vid,* to see, *rag,* to rule, *mar,* to die. These simple sounds seem to have already become fixed to carry their meanings in the remote ages when the ancestors of the Aryan peoples wandered with their herds on the highlands of Central Asia. It is not needful to tell the student of anthropology how interesting it is to arrive thus at the earliest known root-words of any family. But it should at the same time be noticed that, even in the earliest of these sets of roots, we seldom come to anything like an actual origin

or beginning. Some few may indeed have been taken direct from the natural language, for instance *ru*, to roar, and if this was so here is a real origin. But most roots, to whatever languages of the world they may belong, are like the group given above, where it is impossible to say confidently how their sound came to express their meaning. Unless this can be done, it is safest not to take such roots as really primitive formations, for they may have a long lost history of the utmost change. How this may happen, our own language has a useful lesson to teach. Imagine one who knows no language but English trying to get at its roots. To him the verb to *roll* might seem a root-word, a primitive element of language; indeed it actually has been fancied a natural sound imitating the act of rolling. Yet any philologist would tell him that English *roll* is a comparatively modern form, which came through a long series of earlier stages; it was borrowed from French *rolle, roller,* now *rôle, rouler,* all from Latin *rotulus,* diminutive of *rota,* a wheel, even this coming from a more ancient verb and signifying a runner or goer. Still more adventurous is the history of another English word which has now all the parts of a verb, to *check, checking, checked,* besides such forms as a *check* in one's course, the *check*-string to stop the coachman, the *check*-valve to stop the water in a pipe. This word *check* has all the simplicity of sound and sense which might belong to an original root-word. Yet, strange to say, it is really the Persian word *shah,* meaning "king," which came to Europe with the game of chess as the word of challenge to the king, and thence by a curious metaphor passed into a general word for stopping anybody or anything. For all that is known, many root-words among the Greeks or Jews, or even the simple-looking monosyllables of the Chinese, may during prehistoric ages have travelled as far from their real origin as these English verbs. Thus the roots from which language grows may often be themselves sprung as it were from yet earlier seeds or cuttings, grown at home or imported from abroad, and, though in our time words mostly come from the ancient roots, the power of striking new roots is not yet dead.

Having now, in such a broad way as suits the present purpose, looked at the formation of words, something may be said as to how language contrives to show the relations among the words of a sentence. This is done by what grammarians call syntax, concord, and govern-

ment. It has been seen (p. 95) that the gesture-language, though wanting in grammatical forms, has a strongly marked syntax. The deaf-mute's signs must follow one another in proper order, otherwise they may convey a wrong meaning or seem nonsense. So, in spoken languages which do not inflect their words, such as the Chinese, syntax is the main part of grammar; thus *li ping* = sharp weapons, *ping li* = weapons (are) sharp; *chi kuo* = to govern the kingdom, but *kuo chi* = the kingdom is governed. This seems quite natural to us, for modern English has come far towards the Chinese plan of making the sense of the sentence depend on the order of the words, thus marking the difference between *rank of families* and *families of rank*, or between *men kill lions* and *lions kill men*. In Latin it is very different, where words can be put about with such freedom that the English reader may be hardly able to make sense of one of Tacitus' sentences without fresh sorting the words into some order he can think them in. Especially in Latin verses there is often hardly more syntax than if the words were nonsense-syllables arranged only to scan. The sense has to be made out from the grammatical inflections, as where it is seen that in "vile potabis modicis Sabinum cantharis," the cheapness has to do with the wine and the smallness with the mugs. It is because so many of the inflections have disappeared from English, that the English translation has to obtain a proper understanding by stricter order of words. Where the meaning of sentences depends on order or syntax, that order must be followed, but it must be borne in mind that this order differs in different languages. For a single instance, in Malay, where *orang* = man and *utan* = forest, savages and apes are called *orang utan*, which is just opposite to the English construction "forest man."

Every one who can construe Greek and Latin sees what real service is done by government and agreement in showing how the words of a sentence hang together, what quality is stated of what thing, or who is asserted to act on what. But even Greek and Latin have changed so much from their earlier state, that they often fail to show the scholar clearly what they mean to do, and why. It is useful to make acquaintance with the languages of ruder nations, which show government and agreement in earlier and plainer stages of growth. One great object of grammatical construction is to make it

quite clear which of two nouns concerned is subject and which object: for instance, whether it was a chief who killed a bear, or a bear who killed a chief. A particle properly attached will do this, as when the Algonquin Indians put on the syllable *un* both to noun and verb, in a way which we may try to translate by the pronoun *him*, thus :—

Ogimau	ogi	nissa*un*	mukw*un*.
chief	he-did	kill-*him*	bear-*him*.
Mukwah	ogi	nissa*un*	ogima*un*.
bear	he-did	kill-*him*	chief-*him*.

This gives a notion of the natural manner in which grammatical government may have come into use to mark the parts of the sentence. At the same time, it shows that different languages may go different ways to work, for here the verb and object agree together, and the subject (so to speak) governs both, which is quite unlike our familiar rule of the verb agreeing with the nominative or subject. To see the working of concord or agreement in a far clearer and completer form than Latin can show it, we may look at the Hottentot language, where a sentence may run somewhat thus, "That woman-*she*, our tribe's-*she*, rich-being-*she*, another village-in-dwelling-*she*, praise-we-do cattle-of-*she*, *she*-does present-us two calves-of-*she*-form." Here the pronoun running through the whole sentence makes it clear to the dullest hearer that it is the woman who is rich, who dwells in another village, whose cattle are praised, and who gives two of her calves. The terminations in a Greek or Latin sentence, which show the agreement of substantive and adjective with their proper verb, are remains of affixes which may have once carried their signification as plainly as they still do in the language of the Hottentots. A different plan of concord, but even more instructive to the classical scholar, appears in the Zulu language, which divides things into classes, and then carries the marking syllables of the class right through the sentence, so as to connect all the words it is attached to. Thus "u-*bu*-kosi *b*-etu o-*bu*-kulu *bu*-ya-bonakala si-*bu*-tanda," means "our great kingdom appears, we love it." Here *bu*, the mark of the class to which kingdom belongs, is repeated through every word referring to it. To give an idea how this acts in holding the sentence together, Dr. Bleek translates it by repeating the *dom* of king*dom* in a similar way; "the king-*dom*, our *dom*, which *dom* is the great *dom*, the *dom* appears,

we love the *dom.*" This is clumsy, but it answers the great purpose of speech, that of making one's meaning certain beyond mistake. So, by using different class-syllables for singular and plural, and carrying them on through the whole sentence, the Zulu shows the agreement in number more plainly than Greek or Latin can do. But the Zulu language does not recognize by its class-syllables what we call gender. It is in fact one of the puzzles of philology, what can have led the speaker of Aryan languages like Greek, or Semitic languages like Hebrew, to classify things and thoughts by sex so unreasonably as they do. For Latin examples, take the following groups: *pes* (masc.), *manus* (fem.), *brachium* (neut.); *amor* (masc.), *virtus* (fem.), *delictum* (neut.). German shows gender in as practically absurd a state, as witness *der* Hund, *die* Ratte; *das* Their, *die* Pflanze. In Anglo-Saxon, *wîf* (English *wife*) was neuter, while *wîf-man* (i.e. "wife-man," English *woman*) was masculine. Modern English, in discarding an old system of grammatical gender that had come to be worse than useless, has set an example which French and German might do well to follow. Yet it must be borne in mind that the devices of language, though they may decay into absurdity, were never originally absurd. No doubt the gender-system of the classic languages is the remains of an older and more consistent plan. There are languages outside our classical education which show that *gender* (that is *genus*, kind, class) is by no means necessarily according to sex. Thus in the Algonquin languages of North America, and the Dravidian languages of South India, things are divided not as male or female, but as alive or dead, rational or irrational, and put accordingly in the animate or major gender, or in the inanimate or minor gender. Having noticed how the Zulu concord does its work by regularly repeating the class-sign, we seem to understand how in the Aryan languages the signs of number and gender may have come to be used as a simular means of carrying through the sentence the information that this substantive belongs to that adjective and that verb. Yet even in Sanskrit, Greek, Latin, and Gothic, such concord falls short of the fullness and clearness it has among the barbarians of Africa, while in the languages of modern Europe, especially our own, it has mostly disappeared, probably because with the advance of intelligence it was no longer found necessary.

The facts in this chapter will have given the reader some idea how man has been and still is at work building up language. Any one who began by studying the grammars of such languages as Greek or Arabic, or even of such barbarous tongues as Zulu or Eskimo, would think them wonderfully artificial systems. Indeed, had one of these languages suddenly come into existence among a tribe of men, this would have been an event mysterious and unaccountable in the highest degree. But when one begins at the other end, by noticing the steps by which word-making and composition, declension and conjugation, concord and syntax, arise from the simplest and rudest beginnings, then the formation of language is seen to be reasonable, purposeful and intelligible. It was shown in the last chapter that man still possesses the faculty of bringing into use fresh sounds to express thoughts, and now it may be added that he still possesses the faculty of framing these sounds into full articulate speech. Thus every human tribe has the capabilities which, had they not inherited a language ready-made from their parents, would have enabled them to make a new language of their own.

CHAPTER VI

LANGUAGE AND RACE

Adoption and loss of Language, 120—Ancestral Language, 121—Families of Language, 122—Aryan, 123—Semitic, 125—Egyptian, Berber, &c., 126—Tatar or Turanian, 127—South-East Asian, 128—Malayo-Polynesian, 129—Dravidian, 129—African, Bantu, Hottentot, 129—American, 130—Early Languages and Races, 130.

THE next question is, What can be learnt from languages as to the history of the nations speaking them, and the races these nations belong to?

In former chapters, in dividing mankind into stocks or races according to their skulls, complexions, and other bodily characters, language was not taken into account as a mark of race. In fact, a man's language is no full and certain proof of his parentage. There are even cases in which it is totally misleading, as when some of us have seen persons whose language is English, but their faces Chinese or African, and who, on inquiry, are found to have been brought away in infancy from their native countries. It is within every one's experience how one parent language disappears in intermarriage, as where persons called Boileau or Muller may be now absolutely English as to language, in spite of their French or German ancestry. Now not only individuals but whole populations may have their native languages thus lost or absorbed. The negroes shipped as slaves to America were taken from many tribes and had no native tongue in common, so that they came to talk to one another in the language of their white masters, and there is now to be seen the curious spectacle of black woolly-haired families talking broken-down dialects of English, French, or Spanish. In our own country the Keltic language of the Ancient Britons has not long since fallen out of use in Cornwall, as in time it will in Wales. But whether the Keltic language is spoken or not, the Keltic blood remains in the mixed population of Cornwall, and to class the modern Cornishmen as of pure English race because they speak English would be

to misuse the evidence of language. Much bad anthropology has been made by thus carelessly taking language and race as though they went always and exactly together. Yet they do go together to a great extent. Although what a man's language really proves is not his parentage but his bringing-up, yet most children are in fact brought up by their own parents, and inherit their language as well as their features. So long as people of one race and speech live together in their own nation, their language will remain a race-mark common to all. And although migration and intermarriage, conquest and slavery interfere, from time to time, so that the native tongue of a nation can never tell the whole story of their ancestry, still it tells a part of it, and that a most important part. Thus in Cornwall the English tongue is a real record of the settlement of the English there, though it fails to tell of the Keltic race who were in the land before them, and with whom they mixed. In a word, the information which the language of a nation gives as to its race is something like what a man's surname tells as to his family, by no means the whole history, but one great line of it.

It has next to be seen what the languages of the world can show as to the early history of nations. Great care has to be taken with the proofs of connexion between languages. It is of little use to compare two languages as old-fashioned philologists were too apt to do when, if they found half-a-dozen words at all similar, they took these without more ado to be remnants of one primitive tongue, the origin of both. In the more careful philological comparisons of the present day many similarities of words have to be thrown aside as not proving connexion at all. In any two languages a few words are sure to be similar by mere accident, as where, in the Society Islands, *tiputa* means a cloak, like *tippet* with us. Words must only be compared when there is a real correspondence of meaning as well as sound, or the way would be opened for fancies like that of a writer who connects the well-known Polynesian word *tabu*, sacred, with *tabut*, the Arabic name of the ark of the covenant, apparently because that was a very sacred object. Also, words imitated from nature prove nothing in this way, as where the Hindus and the savages of Vancouver's Island both call a crow *kaka*, this being not because their languages are connected, but because it is the bird's cry. What is most important of all is to make

sure that the words compared really belong to the old stock of the language they are found in. Before now a writer has proved to his own satisfaction that Turkish, Arabic, and Persian are all branches of one primitive language, his argument being that the Turks call a man *adam*, as the Arabs call the first man, and a father *pader*, which is like the Persian word. The fact is true enough, but what the argument omits to notice is that the Turks have been for ages enriching their own barbaric language by taking words from the cultured Arabic and Persian, and *adam* and *pader* are such lately borrowed words, not philologically Turkish at all. Borrowed words like these are indeed valuable evidence, but what they prove is not the common origin of languages; it is intercourse between the nations speaking them. They often give the clue to the country from which some new produce was obtained, or some new instrument, or idea, or institution, was learnt. Thus in English it is seen by the very words how Italy furnished us with *opera*, *sonata*, *chiaroscuro*, while Spain gave *gallina* and *mulatto*, how from the Hebrews we have *sabbath* and *jubilee*, from the Arabs *zero* and *magazine*, while Mexico has supplied *chocolate* and *tomato*, Haiti *hammock* and *hurricane*, Peru *guano* and *quinine*, and even the languages of the South Sea Islands are represented by *taboo* and *tatoo*. But in all this there is not one particle of evidence that any one of these languages is sprung from the same family with any other.

When two languages have such a common descent, the philologist is not content to ascertain it by merely looking for a few words of similar sound. Indeed he expects to find that the words of the ancestral language will not only have changed in its descendant languages, but that they will often have changed according to different rules. Thus he knows that according to the rule called Grimm's law, the English *ten*, *tame*, should appear in German with a different initial, *zehn*, *zahm*, while again these should be represented in Latin by *decem*, *domare*. With the same regularity of change, the sound which in some of the Polynesian languages is *k*, in others has become *t*; thus the word man, in the Sandwich Islands *kanaka* (whence our sailors call any South Sea Islander a *kanaker*), appears in New Zealand under the form of *tangata*. Going beyond the sound of words into their structure, the comparative philologist reckons that, when two languages are allied, they ought

to show such similarity in the roots and in the putting together that neither chance nor borrowing can account for the resemblance. In the first chapter, for another purpose, examples were given of languages continuing to show their intimate connexion while diverging from their parent tongues. The reader may find it worth while to look back to these illustrations (p. 6) before going on to the following sketch of the families of language belonging to the various races of man.

The languages of white men mostly belong to two great families, the Aryan and Semitic. First as to the Aryan family, called also Indo-European, which takes in the languages of part of South and West Asia, and almost the whole of Europe. The original tongue whence these are all descended may be called the Primitive Aryan. What the roots of this ancient language were like, and how they were put together into words, the student may gain an idea from Greek and Latin, but a still better from Sanskrit, where both roots and inflexions have been kept up in a more perfect and regular state. As a rough illustration of the way in which words of our familiar European languages may be discerned in Sanskrit, one line of the first hymn of the Veda is here given, where the worshippers entreat Agni, the divine Fire, that he will be approachable to us as a father to a son, and will be near for our happiness :

Sa nah pitâ-iva sûnave Agne su-upâyanah bhava : sachasva nah svastaye.

Here may be more or less clearly made out words connected with Latin, Greek, and English *nos, pater, son, ignis, up, be, sequi, euestō*, and others. Though the original Aryan is a lost language, philologists try to reconstruct it by comparing its oldest and most perfect descendants, Sanskrit, Old Persian, Greek, Latin, Old Russian, Gothic, Old Irish, &c. Granting that a primitive Aryan tongue once existed, there must once have been a nation who spoke it, and whose descendants carried it down to later ages. It is hard to draw any certain bodily picture of the primitive Aryans themselves (see page 88), for in their course of migration and conquest they so mingled with other races, that now the nations united by Aryan speech range through the utmost varieties of white men, from the Icelander to the Hindu. A well-known theory is that the early home of the Aryans was in Inner Asia, in the regions of the Oxus and Yaxartes,

for here the practicable way of migration for nomads with flocks and herds lie open down into Persia on the one side, and India on the other. As India and Persia have preserved in their sacred languages the Aryan tongue in early forms, it has been judged that the land whence the invading Aryans came was not far off. But it may have been further east in Central Asia, or, as is the opinion of a modern school of anthropologists, in the regions of Northern Europe where the fair-complexioned Aryan nations congregate. In this home-land, wherever it may have been, the Aryans lived in barbaric but not savage clans, tilling the soil, and grazing their flocks and herds, a warlike folk skilled in many arts of life, a people able to make laws and abide by them, a religious people earnest in the worship of the sun, and sky, and fire, and waters, and with pious faith in the divine spirits of their ancestors. Carrying with them their language, laws, and religion, these nation-founders spread in radiating tracks, of migration over South-West Asia and all Europe. Where they went they found the land peopled by Dravidians, Tatars, and doubtless many other stocks once spread far and wide, like the Basques, whose language still lingers in the Pyrenees. Where the old languages have vanished, the record of the early populations of Europe is only to be had from their tombs, and seen in the features of the present nations, which may be often more those of the original people than of the Aryan invaders. The earliest Aryan hordes who spread from their first centre may have been the ancestors of the Keltic nations, for their language has undergone most change, and they are found in the far west of Europe, as though they had been pressed on by the Teuton-Scandinavian tribes who followed them, distant kinsfolk but not friends. The ancestors of the Græco-Italian nations migrated till they reached the Mediterranean, and behind them came the Slavonic peoples who now occupy Eastern Europe. Thus much of the beginnings of the Aryan nations may be learnt from their languages and their places on the map. It is not in the earliest ages of history that they appear on the world-stage where Egyptians and Babylonians had long played the great parts. The Aryans become prominent within a thousand years before the Christian era, when in India there arises among them the religion of Buddha, now reckoned the most numerous in the world; when the Medes and Persians come into power, and Cyrus

appears with his conquering host; when the Greeks bring their wondrous intellect to bear on art, science, and philosophy; and the Romans set up the military and legal system which gave them their empire. In later ages our Teutonic nations, who made their first appearance as the ravagers of culture, come to be its promoters. The Aryan nations have kept up in the modern world the career of conquest and the union with other peoples which they began in prehistoric ages. Outside the world known to the ancients, Aryan languages are now spoken on far continents and islands, whether the men who speak them are white colonists from Europe, who have slain or driven out the old dwellers on the soil, or whether they have become blended with the native nations as in Mexico and Peru.

To proceed now to the languages of the next family, the Semitic, an idea of these can be most easily gained from Hebrew. Any student seriously bent on the science of language should learn at least enough Hebrew to spell out a few chapters of Genesis, for all the other languages commonly taught in England being of the Aryan family, this will serve to bring his mind out of that groove, by familiarizing him with speech of a different material. A very moderate number of roots, mostly of three consonants, by altering their internal vowels and changing their affixes, are made to form the greater part of the language so regularly that Hebrew dictionaries are arranged throughout by the roots. Thus from the root *m-l-ch* are derived verb and noun forms with the sense of reigning, as *mâlach* = he reigned, *mâlchû* = they reigned, *yimloch* = he shall reign, *timloch* = thou shalt reign, *melech* = king (familiar in the name of *Melchizedek*, "king of righteousness"), *melâchim* = kings, *malchenû* = our king, *malchâh* = queen, *mamlâchâh* = kingdom, and so on. The principal languages belonging to the Semitic family are the Assyrian, Hebrew and Phœnician, Syrian, Arabic, and Ethiopic. The Assyrian of the Nineveh inscriptions and the Arabic spoken by the desert Beduins between them best represent the original language they are all descended from. The ancient or modern peoples speaking Semitic tongues belong mainly to the dark-white race, the type in which they agree being now most plainly seen in the Jewish countenance, with its aquiline nose, full lips, and curly black hair. Yet by features alone it would not have been possible to distinguish the Jews, Assyrians, and Arabs, among the

mass of dark-white nations. Here is seen the value of language, which comes in to show that a certain group of nations are connected by common ancestry from an ancient people, who spoke the lost tongue whence Arabic and Hebrew are offshoots, and who in the ages when history begins were dwelling in South-West Asia, and sending forth their migrating tribes to found new nations, whose acts in the world form one of the great chapters of history. The conquering Assyrians took up and carried on the older Chaldæan civilization. The Phœnicians became the great merchants of the old world, with trading colonies along the Mediterranean and commerce in the far East; nor was it only stuffs and spices that they carried, but they spread arts and thoughts into new regions, and in their hands the clumsy hieroglyphic writing became the alphabet. The Israelites, though as a nation they never reached such power or culture, made their conquests in the world of religion, and while the crowd of deities worshipped in Assyrian and Phœnician temples vanished away, the worship of Jehovah passed on into Christianity, and overspread the world. Latest, the warrior-tribes of Arabia carried the banner of their prophet among the nations around, and founded the faith of Islam, a civilizing power in the Middle Ages, and even in these days of its decay an influence across the world from Western Africa to the islands of the far East.

The language of the ancient Egyptians, though it cannot be classed in the Semitic family with Hebrew, has important points of correspondence, whether due to the long intercourse between the two races in Egypt, or to some deeper ancestral connexion; and such analogies also appear in the Berber languages of North Africa. These difficult questions can merely be mentioned here. Attempts have been made, though with little result, to prove the Aryan and Semitic languages themselves to be descended from a single parent tongue. If it is so, then ages of change have so wiped away the traces of common origin that philological comparison fails to substantiate them. While speaking of the Aryan and Semitic families of language, it should be noticed that many philologists connect them as belonging to one class, as being " inflecting " languages, or such as can blend their roots and affixes, and alter the roots themselves internally so that, as the beginner in Greek grammar well knows, it is often no easy matter to see

where the root ends and the termination begins. The inflecting families have certainly a power of compact word-formation which has done much to give expressiveness and accuracy to such poetical and philosophical languages as Greek and Arabic. But the distinction is by no means clear between the structure of such inflecting languages and the agglutinating languages of other nations, as the Tatars. Could the Aryan and Semitic families be both traced back to the same family, this would not prove the whole white race to have had one original language, for the Georgian of the Caucasus, the Basque of the Pyrenees, and several more would still lie outside, apparently unconnected with either of the great families, or with one another.

In the middle and north of Asia, on the steppes or among the swamps and forests of the bleak north, wandering hordes of hunters or herdsmen show the squat-built brown-yellow Tatar or Mongolian type, and speak languages of one family, such as Manchu and Mongol. Although principally belonging to Asia, these Tatar or Turanian languages have established themselves in Europe. At a remote period, rude Tatar tribes had spread over northern Europe, but they were followed up and encroached on by the invading Aryans, till now only much-mixed outlying remnants of them, Esths, Finns, Lapps, are found speaking Tatar languages. In later ages, history records how armies of Tatar race, Huns and Turks, poured into Europe in their turn, subduing the Aryan peoples, so that now the Hungarian and Turkish languages remain records of these last waves of invasion from Central Asia. The Tatar hordes are first heard of in history as barbarians, as many tribes are still, but their chief nations becoming Buddhists, Mohammedans, or Christians, have adopted the civilization belonging to these religions. The Tatar languages are of the kind called agglutinative, forming words by putting first the root, which carries the sense, and is followed by suffixes strung on to modify it. Thus in Turkish the root *sev*, to love, makes *sevishdirilmediler*, they were not to be brought to love one another. In some languages of this class, a remarkable law of vowel-harmony compels the suffix to conform its vowel to that of the root it is attached to, as if to make clear to the hearer that it belongs to it; thus in Hungarian *ház* = house, forms *házam* = my house, but *szék* = chair, forms *székem* = my chair.

The dense population of South-East Asia, comprising the Burmese, the Siamese, and especially the Chinese, shows a type of complexion and feature plainly related to the Tatar or Mongolian, but the general character of their language is different. The Chinese language is made up of monosyllables, each a word with its own real or grammatical sense, so that our infant-school books in one syllable give some notion of Chinese sentences. Other neighbouring languages share this habit of using monosyllables, and as this limits them to an inconveniently small number of words, they have taken to the expedient of making the musical pitch or intonation alter the meaning, as in Siamese, where the syllable *ha*, according to the notes it is intoned on, means a pestilence, or the number five, or the verb to seek. Thus the intoning which in England serves to express emotion or distinguish question from answer is turned to account in the far East for making actually different words, an example how language catches at any available device when a means of expression is wanted. Looking on the map of Asia at this south-east group of nations, it is plainly not by accident that the people of such neighbouring districts should have come to talk in words of one syllable, but the habit seems to have come from a common ancestral source, and gives the whole set of languages a family character. These monosyllabic languages are often used to illustrate what the simple childlike constructions of man's primitive speech may have been like. But it is well to mention that Chinese or Siamese, simple as they are, must not be relied on as primitive languages. The childlike Chinese phrases may be not primitive at all, but may come of the falling away of older complicated grammar, much as our own English tends to cut short the long words and drop the inflexions used by our ancestors. Chinese simplicity of grammar by no means goes with simplicity of thought and life. The Chinese nation, like the Egyptian and the Babylonian, had been raised to a highly artificial civilization in ages before the Phœnicians and Greeks came out of barbarism. It is not yet clear to what race the old Babylonians belonged who spoke the Akkadian tongue, but this shows analogies which may connect it with the Tatar or Mongolian languages.

The Malays and Polynesians (p. 79), a varied and mixed population of partly Mongoloid race, are united over their immense ocean-district half round the globe

by languages of one family, the Malayo-Polynesian, to which the Melanesian languages largely belong. The parent tongue of this family may have belonged to Asia, for in the Malay region the grammar is more complex, and words are found like *tasik* = sea and *langit* = sky, while in the distant islands of New Zealand and Hawaii these have come down to *tai* and *lai*, as though the language became shrunk and formless as the race migrated farther from home, and sank into the barbaric life of ocean islanders.

The continent of India has not lost the languages of the tribes who were in the land before the Aryan invasion gave rise to the Hindu population. Especially in the south whole nations, though they have taken to Hindu civilization, speak languages belonging to the Dravidian family, such as Tamil, Telugu, and Canarese. The importance of this element of Indian population may be seen by these non-Aryan tongues still extending over most of the great triangle of India south of the Nerbudda, besides remnants in districts to the north. Yet Aryan dialects are spoken in India by many mixed tribes who may have little of Aryan blood. In the forests of Ceylon are found the only people in the world leading a savage life who speak an Aryan language akin to ours. These are the Veddas or "hunters," shy wild men who build bough huts, and live on game and wild honey, the children, as it seems, of forest-natives mingled with Singhalese outcasts whose language in a broken-down state they speak.

Among negroid peoples, whether or not the Andamaners and Papuas are connected by race with the African negroes, their languages show no connexion. Nor do all African negroes speak languages of one family, but some, such as the Mandingo, seem separate from the great language-family of Central and South Africa, named the Bantu from tribes calling themselves simply "men" (*ba-ntu*). One of the chief peculiarities of the Bantu languages is their working (just unlike the Tatar languages) by putting prefixes in front. Thus the African magician is called *mganga*, the plural of which is *waganga*, magicians. The Kafirs of a certain district bear the well-known name of the *basuto*, which is a plural form, a single native being called *mosuto*, while his country is *lesuto*, his language *sesuto*, and his character or quality *bosuto*. In South Africa lives a very different language-family, the Hottentot-Bushman, remarkable for the way

in which "clicks," much like what among us nurses make to children and coachmen to horses, do duty as consonants in words. Lastly, turning to America, the native languages fall into a variety of families. Some of these are known to English readers by a word or two, as the Eskimo of the Arctic coasts by the name of the *kayak* or single boat on which our sport canoes are modelled; the Algonquin which prevailed from New England to Virginia at the time of the early colonists, and whence we have *moccasin* and *tomahawk*; the Aztec of Mexico known by the *ocelot* and the *cacao*-bean; the Tupi-Carib of the West Indies and the Brazilian forests, the home of the *toucan* and *jaguar*; lastly the Quichua or Peruvian, the language of the *inca*.

In concluding this account of the chief families of language, it is to be noticed that there are many more, some consisting of only a few dialects or a single one. Altogether a list of fifty or a hundred might perhaps be made, of which no one has been satisfactorily shown to be related to any other. It may, indeed, be expected that often two or three which now seem separate may prove on closer examination to be branches of one family, but there seems no prospect of the families all coming together in this way as offshoots of one original language. The question whether there was one primitive speech, or many, has been in past times most useful in encouraging the scientific comparison of languages. Both theories claim to account for the actual state of language in the world. On the one hand it may be argued that the languages descended from the primitive tongue have branched off so far apart as often no longer to show their connexion; on the other hand, if there were many primitive languages, of which those that survived have given rise to families, this would come to much the same state of things. But if, as seems likely, the original formation of language did not take place all at once, but was a gradual process extending through ages, and not absolutely stopped even now, then it is not a hopeful task to search for primitive languages at all (see page 104). In the present improved state of philology it answers better to work back from known languages to the lost ancestral languages whence they must have come down. It has been seen that this study leads to excellent results as to the history, not only of the languages themselves, but of the nations speaking them, as when it gives the clue to the peopling of the South Sea Islands, or proves

some remote ancestral connexion between the ancient Britons and the English and Danes who came after them to our land. Yet though language is so valuable a help and guide in national history, it must not be trusted as if it could give the whole origin of a race, or go back to its beginning. All negroes do not speak languages of one family, nor all yellow, or brown, or white men. In exploring the early life of nations, their languages may lead us far back, often much farther than historical records, but they seem hardly to reach anywhere near the origins of the great human races, still less to the general origin of mankind.

CHAPTER VII

WRITING

Picture-writing, 132—Sound-pictures, 134—Chinese Writing, 134—Cuneiform Writing, 136—Egyptian Writing, 136—Alphabetic Writing, 138—Spelling, 141—Printing, 142.

TAUGHT as we are to read and write in early childhood, we hardly realize the place this wondrous double art fills in civilized life, till we see how it strikes the barbarian who has not even a notion that such a thing can be. John Williams, the South Sea Island missionary, tells how once being busy carpentering, and having forgotten his square, he wrote a message for it with a bit of charcoal on a chip, and sent this to his wife by a native chief, who, amazed to find that the chip could talk without a mouth, for long afterwards carried it hung by a string round his neck, and told his wondering countrymen what he saw it do. So in South Africa a black messenger carrying a letter has been known to hide it under a stone while he loitered by the way, lest it should tell tales of him, as it did of whatever was going on. Yet the art of writing, mysterious as it seemed to these rude men, was itself developed by a few steps of invention, which if not easy to make, are at any rate easy to understand when made. Even uncivilized races have made the first step, that of picture-writing. Had the missionary merely made a sketch of his L-square on the chip, it would have carried his message, and the native would have understood the whole business as a matter of course. Beginning at this primitive stage, it will be possible to follow thence through its whole course the history of writing and printing.

Fig. 47 shows a specimen of picture-writing as used by the hunting tribes of North America. It records an expedition across Lake Superior, led by a chief who is shown on horseback with his magical drumstick in his hand. There were in all fifty-one men in five canoes, the first of them being led by the chief's ally, whose

name, Kishkemunazee, that is, Kingfisher, is shown by the drawing of this bird. Their reaching the other side seems to be shown by the land-tortoise, the well-known emblem of land, while by the picture of three suns under the sky it is recorded that the crossing took three days. Now most of this, childlike in its simplicity, consists in making pictures of the very objects meant to be talked of. But there are devices which go beyond this mere imitation. Thus when the tortoise is put to represent land, it is no longer a mere imitation, but has become an emblem or symbol. And where the bird is drawn to mean not a real kingfisher, but a man of that name, we see the first step toward phonetic writing or sound-writing, the principle of which is to make a

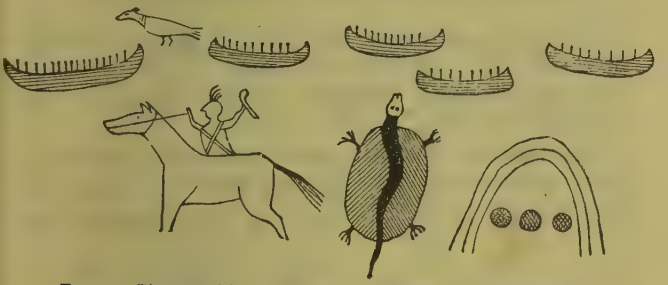


FIG. 47.—Picture-writing, rock near Lake Superior (after Schoolcraft).

picture stand for the sound of a spoken word. How men may have made the next move toward writing may be learnt from the common child's game of *rebus*, that is, writing words "by things." Like many other games, this one keeps up in child's sport what in earlier ages was man's earnest. Thus if one writes the word "water-man" by a picture of a water-jug and a man, this is drawing the meaning of the word in a way hardly beyond the American Indian's picture of the kingfisher. But it is very different when in a child's book of puzzles one finds the drawing of a water-can, a man being shot, and a date-fruit, this representing in rebus the word "can-di-date." For now what the pictures have come to stand for is no longer their meaning, but their mere sound. This is true phonetic writing, though of a rude kind, and shows how the practical art of writing really

came to be invented. This invention seems to have been made more than once, and in somewhat different ways. The old Mexicans, before the arrival of the Spaniards, had got so far as to spell their names of persons and places by pictures, rebus fashion. Even when they began to be Christianized, they contrived to use their picture-writing for the Latin words of their new religion. Thus they painted a flag (*pan*), a stone (*te*), a prickly-pear (*noch*) (Fig. 48), which were together

FIG. 48.—*Pater noster* in Mexican picture-writing (after Aubin).

pronounced *pa-te-noch-te*, and served to spell *pater noster*, in a way that was tolerably exact for Mexicans who had no *r* in their language. In the same way they ended the prayer with the picture of water (*a*), and aloe (*me*), to express *amen*.

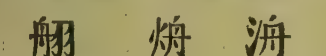
This leads on to a more important system of writing. Looking at the ordinary Chinese characters on tea-chests or vases, one would hardly think they ever had to do with pictures of things. But there are fortunately pre-

FIG. 49.—Chinese ancient pictures and later cursive forms (after Endlicher).

served certain early Chinese characters, known as the "ancient pictures," which show how what were at first distinctly formed sketches of objects came to be dashed off in a few strokes of the rabbit's-hair pencil, till they passed into the meaningless-looking cursive forms now in use, as is seen in Fig. 49.

The Chinese did not stop short at making such mere pictures of objects, which goes but little way toward writing. The inventors of the present mode of Chinese writing wanted to represent the spoken sounds, but here they were put in a difficulty by their language

consisting of monosyllables, so that one word has many different meanings. To meet this they devised an ingenious plan of making compound characters, or "pictures and sounds," in which one part gives the sound, while the other gives the sense. To give an idea of this, suppose it were agreed that a picture of a box should stand for the sound *box*. As, however, this sound has several meanings, some sign must be added to show which is intended. Thus a key might be drawn beside it to show it is a *box* to put things in, or a leaf if it is to mean the plant called *box*, or a hand if it is intended for a *box* on the ear, or a whip would show that it was to signify the *box* of a coach. This would be for us a clumsy proceeding, but it would be a great advance beyond mere picture-writing, as it would make sure at once of the sound and the meaning. Thus in Chinese, the sound *chow* has various meanings, as ship, fluff, flickering, basin, loquacity. Therefore the character



ship fluff flickering basin loquacity

FIG. 50.—Chinese compound characters, pictures and sounds.

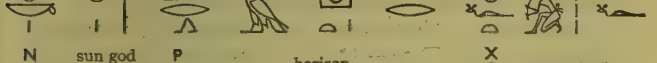
which represents a ship, *chow*, which is placed first in Fig. 50, is repeated afterwards with additional characters to show which particular meaning of *chow* is intended. A recognizable pair of feathers is placed by it to mean *chow* = fluff; next, the sign of fire makes it *chow* = flickering; next, the sign of water makes it *chow* = basin; and lastly, the character for speech is joined to it to make *chow* = loquacity. These examples, though far from explaining the whole mystery of Chinese writing, give some idea of the principles of its sound-characters and keys or determinative signs, and show why a Chinese has to master such an immensely complicated set of characters in order to write his own language. To have introduced such a method of writing was an effort of inventive genius in the ancient Chinese, which their modern descendants show their respect for by refusing to improve upon it. At the same time it is not entirely through conservatism that they have not taken to phonetic writing like that of the western nations, for this would, for instance, confuse the various kinds of *chow* which their present characters enable them to keep

separate. But the Japanese, whose language was better suited than the Chinese for being written phonetically, actually made themselves a phonetic system out of the Chinese characters. Selecting certain of these, they cut them down into signs to express sounds, one to stand for *i*, another for *ro*, another for *ha*, &c. Thus a set of forty-seven such characters (which they call accordingly the *iroha*) serve as the foundation of a system with which for centuries Japanese has been written and its dictionaries arranged by sound.

Next, as to the cuneiform writing, such as is to be seen at the British Museum on the huge man-headed bulls of Nineveh, or on the flat baked bricks which were pages of books in the library of Sennacherib. The marks like wedges or arrow-heads arranged in groups and rows do not look much like pictures of objects. Yet there is evidence that they came at first from picture-writing; for instance, the sun was represented by a rude figure of it made by four strokes arranged round. Of the groups of characters in an inscription, some serve directly to represent objects, as man, woman, river, house, while other groups are read phonetically as standing for syllables. The inventors of this ancient system appear to have belonged to the Akkadian group of nations, the founders of early Babylonian civilization. In later ages the Assyrians and Persians learned to write their languages by cuneiform characters, in inscriptions which remain to this day as their oldest records. But the cuneiform writing was cumbrous in the extreme, and had to give way when it came into competition with the alphabet. To understand the origin of that invention, it is necessary to go back to a plan of writing which dates from antiquity probably even higher than the cuneiform of Babylonia, namely, the hieroglyphics of Egypt.

The earliest known hieroglyphic inscriptions of Egypt belong to a period approaching 4000 B.C. Even at this ancient time the plan of writing was so far developed that the scribes had the means of spelling any word phonetically, when they chose. But though the Egyptians had thus come to writing by sound, they only trusted to it in part, combining it with signs which are evidently remains of earlier picture-writing. Thus the mere pictures of an ox, a star, a pair of sandals, may stand for ox, star, sandals. Even where they spelt words by their sounds, they had a remarkable way of

adding what are called determinatives, which are pictures to confirm or explain the meaning of the spelt word. One short sentence given as an example from Renouf's *Egyptian Grammar*, shows all these devices. The meaning is: "I (am) the Sun-god coming forth from the



N	sun god	P		horizon		X	
K	one	R	M	T one	R	F	enemy pl. F
one		walk				T.	
nuk	ra netar	per	em	xut	er	xeftu—f	
I	sun god	coming forth	from	horizon	against	enemies—his	

horizon against his enemies." Here part of the pictures of animals and things are letters to be read into Egyptian words, as shown underneath. But others are still real pictures, intended to stand for what they represent. The sun is shown by his picture, with a one-mark below, and followed by the battle-axe, which is the symbol of divinity, while farther on comes a picture of the horizon with the sun on it. Beside these, some of the figures are determinative pictures to explain the words, the verb to walk being followed by an explanatory pair of legs, and the word enemy having the picture of an enemy after it, and then three strokes, the sign of plurality. It seems that the Egyptians began with mere picture-writing like that of the barbarous tribes of America, and though in after ages they came to use some figures as phonetic characters or letters, they never had the strength of mind to rely on them entirely, but went on using the old pictures as well. How they were led to make a picture stand for a sound is not hard to see. In the figure a character may be noticed which is read R. This is an outline of an open mouth, and indeed is often used to represent a mouth; but the Egyptian word for mouth being RO, the sign came to be used as a character or letter to spell the sound RO or R wherever it was wanted. So much of the history of the art of writing may thus be read in a single hieroglyphic sentence.

These carefully drawn hieroglyphic or "sacred-sculpture" pictures, used as they were for the solemn records of church and state, were kept up for sacred purposes into the time of the Greek dynasty, and even the Roman

empire in Egypt. Indeed after the secret of deciphering them had been lost for many ages, the names of Ptolemy and Cleopatra were among the first identified by Dr. Thomas Young. But from very ancient times the Egyptian scribes, finding the elaborate pictures too troublesome for business writing on papyrus, brought them down (much as the Chinese did theirs) to a few quick strokes. These were the "hieratic" characters, a few of which are seen in the second column of Fig. 51 following their hieroglyphic originals. Yet even when they used these, the Egyptian scribes never freed themselves from the trammels of their early picture-writing, so as to do away with the unnecessary multitude of phonetic signs, and drop the determinative pictures as useless. This great move was made by foreigners.

Tacitus, in a passage of his *Annals* describing the origin of letters, says that the Egyptians first depicted thoughts of the mind by figures of animals, which oldest monuments of human memory are to be seen stamped on the rocks, so that they (the Egyptians) appear as the inventors of letters, which the Phœnician navigators brought thence to Greece, obtaining the glory as if they had discovered what they really borrowed. This account may be substantially true, but it does not give the Phœnicians credit for their practical good sense, which they were able to follow, being strangers and not bound by the sacred traditions of Egypt. Possibly the Phœnicians (or some other Semitic nation), when they learnt the Egyptian hieroglyphics, saw that the picture signs mixed with the spelt words had become mere surplusage, and that all they really wanted was a small number of signs to write the sound of their words with, and thus may have been invented the earliest so-called Phœnician alphabet. Some of its letters may have been actually copied from the Egyptian characters, as is seen by Fig. 51, which shows a selection from the compared set drawn up by De Rougé, so arranged as to pass from the original Egyptian hieroglyphic to its hieratic form in the current writing, and thence to the corresponding letter of the Phœnician alphabet, with its value in our letters and examples of similar letters in other well-known forms of the alphabet.

It seems to have been about the tenth century B.C. that the original alphabet was made, forms of which were used by the Moabites, Phœnicians, Israelites, and other nations of the Semitic family to write their lan-

guages. A curious proof that it was among these Semitic nations that the *alphabet* was first shaped has come down to us in its name. To understand this, it has to be noticed that the letters were named each by a word beginning with it. The Hebrew forms of these names are familiar to English readers from Psalm cxix., where they stand in their order *aleph* or "ox" for *a*, *beth* or "house" for *b*, *gimel* or "camel" for *g*, and so on.

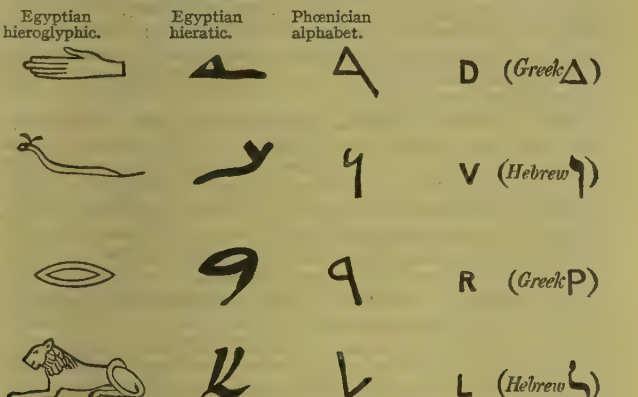


FIG. 51.—Egyptian hieroglyphic and hieratic characters compared with letters of Phœnician and later alphabets (after De Rougé).

This is a natural way of naming letters; indeed our Anglo-Saxon ancestors had another such set of names belonging to the rune-letters they used in old times, calling their letter *b*, *beorc* or "birch," their letter *m*, *man*, their letter *th*, *thorn*. Now what confirms the history that the Phœnicians had the alphabet first and the Greeks learnt the art of writing from them is that the Greeks actually borrowed the Phœnician names for the letters, which were like the Hebrew ones just given, and which in Greek passed into the well-known forms *alpha*, *beta*, *gamma*, &c. Thence comes the word *alphabet*,

which thus preserves the traces of the letters having been made and named by the Phœnicians, having passed from them to the Greeks and Latins, and at last came down to us. It is interesting to look through a book of alphabets, where not only may be traced the history of the Greek and Latin letters, and others plainly related to them, such as the Gothic and Slavonic, but it may even be made out that others at first sight so unlike as the Northmen's runes and the Sanskrit characters, must all be descendants of the primitive alphabet. Thus the Brahman writes his Veda, the Moslem his Koran, the Jew his Old and the Christian his New Testament, in signs which had their origin in the pictures on temple walls in ancient Egypt.

Such changes, however, have taken place in writing, that it often requires most careful comparison to trace them. If one showed a Chinese an English note scribbled in modern handwriting, it would not be quite easy to prove to him that the characters were derived from old Phœnician ones such as those in Fig. 51. Our running-hand must be traced back through copybook-hand, and from small letters to Roman capitals, and so farther back. Readers will find this worth doing as an exercise. They may also be recommended to look at old-fashioned English writing, such as a Parish Register of the 16th century, which will show how much more the writing of that period was like the crabbed hand in which it is still thought proper to write German. We English fortunately learnt a simpler and better style from the Italian writing-masters, who taught us the "Roman hand" which Malvolio recognizes in *Twelfth Night*. Alterations in letters were not only made for convenience, but also for decoration. Thus among the tribes of the Middle Ages there arose fanciful varieties such as what we call Old English and Black Letter, and still use for ornamental purposes. This style of manuscript being in fashion when printing was introduced in Europe, English books were at first printed in it, as many German books are still. One has only to read a page of a German book so printed to satisfy oneself how great a gain of clearness it was to discard these letters with forms broken by unmeaning lines, and return to the more distinct Latin letters we now use.

Beside these general changes of alphabet, the history of writing shows how from time to time alterations have been made as to particular letters. The original

Phœnician alphabet was weak in vowels, in a way which the learner of Hebrew can understand when he tries to read it without the vowel points, which are more modern marks put on for the benefit of those who do not know the language well enough to tell how each word should be pronounced. The Phœnician alphabet did not altogether suit the writers of Greek and Latin, who altered some letters and made new ones in order to write their languages more perfectly, and thus other nations have made free in adding, dropping, and altering letters and their sounds, to get the means required for each to express its own tongue. To such causes may be traced letters not known to the primitive alphabet, such as Greek Ω and English W, which are explained by their names of Omega or "great-O," and "double-U." The digamma or F fell out of use in Greek, and the two valuable Anglo-Saxon *th*-letters, ð and þ, are lost to modern English. The letters H and X are examples of letters which in Greek served purposes other than those English uses them for. By arranging their alphabets to suit the sounds of their languages, nations contrive with more or fewer letters to spell with some accuracy, Italian managing this fairly with twenty-two letters, while Russian uses thirty-six. English has an alphabet of twenty-six letters, but works them without regular system, so that our spelling and pronunciation disagree at every turn. One cause of this state of things has been the attempt to keep up side by side two different spellings, English and French, as where *g* is used to spell both the English word *get* and the French word *gentle*. Another cause has been the attempt to keep up ancient sounds in writing, although they have been dropped in speaking; thus in *throuGH*, *caSTle*, *sCene*, the now silent letters are relics of sounds which used to be really heard in Anglo-Saxon *thurH*, Latin *caSTellum*, Greek *sKēnē*. What makes this the more perplexing is that in many words English writing does simply try to spell what is actually spoken; English *tail* does not keep up the lost guttural of Anglo-Saxon *tægel*, nor does English *palsy* retain letters for the sounds that have vanished in its derivation from French *paralysie*. Our wrong spelling is the result not of rule but of want of rule, and among its most curious cases are those where the grammarians have managed to put both sound and etymology wrong at once, writing *island*, *rhyme*, *scythe*, where their forefathers rationally wrote *iland*,

rime, sithe. It is reckoned that on an average, a year of an English child's education is wasted in overcoming the defects of the present mode of spelling.

The invention of writing was the great movement by which mankind rose from barbarism to civilization. How vast its effect was may be best measured by looking at the low condition of tribes still living without it, dependent on memory for their traditions and rules of life, and unable to amass knowledge as we do by keeping records of events, and storing up new observations for the use of future generations. Thus it is no doubt right to draw the line between barbarian and civilized where the art of writing comes in, for this gives permanence to history, law, and science. Such knowledge so goes with writing that, when a man is spoken of as learned, we at once take it to mean that he has read many books, which are the main source men learn from. Already in ancient times, as compositions of value came to be written, there sprang up a class of copyists or transcribers, whose business was to multiply books. In Alexandria or Rome one could go to the bibliopole or bookseller and buy a manuscript of Demosthenes or Livy, and in later ages the copying of religious books, splendidly illuminated, became a common occupation, especially in monasteries. But manuscripts were costly, only the few scholars could read them, and so no doubt it would have remained had not a new art come in to multiply writing.

This was a process simple enough in itself, and indeed well known from remote ages. Every Egyptian or Babylonian who smeared some black on his signet-ring or engraved cylinder, and took off a copy, had made the first step towards printing. But easy as the further application now seems to us, no one in the Old World saw it. It appears to have been the Chinese who invented the plan of engraving a whole page of characters on a wood-block and printing off many copies. They may have begun as early as the sixth century, and at any rate in the tenth century they were busy printing books. The Chinese writing, from its enormous diversity of characters, is not well suited to printing by movable types, but there is a record that this plan was early devised among them, having been carried on with separate terra-cotta types in the eleventh century. Moslem writers early in the fourteenth century describe Chinese printing, so that it was probably through them

that the art found its way to Europe, where not long afterwards the so-called "block-books," printed from whole page wood-blocks after the Chinese manner, make their appearance, followed by books printed with movable types. Few questions have been more debated by antiquaries than the claims of Gutenberg, Faust, and the others to their share of honour as the inventors of printing. Great as was the service these worthies did to the world, it is only fair to remember that what they did was but to improve the practical application of a Chinese invention. Since their time progress has been made in cheapening types, making paper by machinery, improving the presses, and working them by steam-power, but the idea remains the same. Such is, in few words, the history of the art of printing, to which perhaps, more than to any other influence, is due the difference of our modern life from that of the Middle Ages.

In examining these methods of writing, we began with the rude hunter's pictures, passing on to the Egyptian's use of a picture to represent the sound of its name, then to the breaking down of the picture into a mere sound-sign, till in this last stage the connexion between figure and sound becomes so apparently arbitrary, that the child has to be taught, this sign stands for A, this for B. In curious contrast with this is the modern invention of the phonograph, where the actual sound spoken into the vibrating diaphragm marks indentations in the travelling strip of tinfoil, by which the diaphragm can be afterwards caused to repeat the vibrations and re-utter the sound. When one listens to the tones coming forth from the strip of foil, the South Sea Islander's fancy of the talking chip seems hardly unreasonable.

CHAPTER VIII

ARTS OF LIFE

Development of Instruments, 145—Club, Hammer, 145—Stone-flake, 146—Hatchet, 149—Sabre, Knife, 150—Spear, Dagger, Sword, 151—Carpenter's Tools, 152—Missiles, Javelin, 153—Sling, Spear-thrower, 154—Bow and Arrow, 154—Blow-tube, Gun, 156—Mechanical Power, 156—Wheel-carriage, 157—Hand-mill, 158—Drill, Lathe, 160—Screw, 161—Water mill, Wind-mill, 162.

THE arts by which man defends and maintains himself, and holds rule over the world he lives in, depend so much on his use of instruments, that it will be well to begin with some account of tools and weapons, tracing them from their earliest and rudest forms.

Man is sometimes called, to distinguish him from all lower creatures, the "tool-using animal." This distinction holds good in a general way, marking off man with his spear and hatchet from the bull goring with his horns, or the beaver carpentering with his teeth. But it is instructive to see how plainly the ape tribes, coming nearest to ourselves in having hands, have also rudiments of the implement-using faculty. Untaught by man, they defend themselves with missiles, as when orangs in the durian trees furiously pelt passers-by with the thorny fruit. The chimpanzee in the forests is said to crack nuts with a stone, as in our Zoological Gardens monkeys are often taught to do by the keepers, where they take readily to the use of these and more difficult implements, as soon as the thought has been put into their minds.

The lowest order of implements are those which nature provides ready-made, or wanting just a finish; such are pebbles for slinging or hammering, sharp stone splinters to cut or scrape with, branches for clubs and spears, thorns or teeth to pierce with. These of course are oftenest found in use among savages, yet they sometimes last on in the civilized world, as when we catch up any stick to kill a rat or snake with, or when in the south of France women shell the almonds with a smooth pebble, much as the apes at Regent's Park would do. The

higher implements used by mankind are often plainly improvements on some natural object, but they are adapted by art in ways that beasts have no notion of, so that it is a better definition of man to call him the "tool-maker" than the "tool-user." Looking at the various sorts of implements, we see that they were not invented all at once by sudden flashes of genius, but evolved, or one might almost say grown, by small successive changes. It will be noticed also that the instrument which at first did roughly several kinds of work, afterwards varied off in different ways to suit each particular purpose, so as to give rise to several different instruments. A Zulu seen at work scraping the stick that is to be the shaft of his assegai, with the very iron head that is to be fixed on it, may give an idea what early tool-making was like, before men clearly understood that the pattern of instruments suitable for a lance-head was not the best for cutting and scraping. We should be horrified at the thought of the blacksmith pulling out one of our teeth with his pincers, as our forefathers would have let him do; the forceps we expect the dentist to use is indeed a variety of the smith's tool, but it is a special variety for a special purpose. Thus in the history of instruments, the tools of the mechanic cannot well be kept separate from the weapons of the hunter or soldier, for in several cases it will be seen that both tool and weapon had their origin in some earlier instrument that served alike to break skulls and coco-nuts, or to hack at the limbs of trees and of men.

Among the simplest of weapons is the thick stick or cudgel, which when heavier or knobbed passes into the club. Rude champions have delighted in the ferocious roughness of such a gnarled club as Hercules in the pictures carries on his shoulder, while others spent their leisure hours in elegant shaping and carving, like that of the South Sea Island clubs to be seen in museums. From savage through barbaric times the war-club lasted on into the Middle Ages of Europe, when knights still smashed helmets in with their heavy maces. Mostly used as a weapon, it only now and then appears in peaceful arts, as in the ribbed clubs with which the Polynesian women beat out bark cloth. It is curious to see how the rudest of primitive weapons, after its serious warlike use has ceased, survives as a symbol of power, when the mace is carried as emblem of the royal authority, and is laid on the table during the sitting of

Parliament or the Royal Society. While the club has been generally a weapon, the hammer has been generally an implement. Its history begins with the smooth heavy pebble held in the hand, such as African blacksmiths to this day forge their iron with, on another smooth stone as anvil. It was a great improvement to fasten the stone hammer on a handle; this was done in very ancient times, as is seen by the stone heads being grooved or bored on purpose (see Fig. 54 *i*). Though the iron hammer has superseded these, a trace of the older use of stone remains in our very name *hammer*, which is

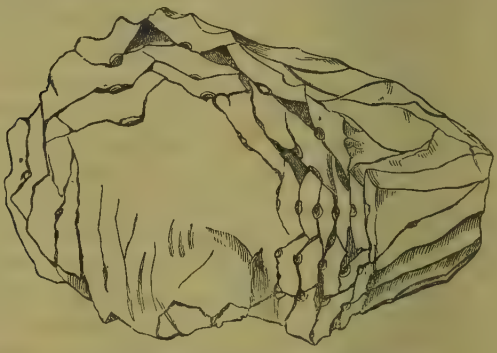


FIG. 52.—Gunflint-maker's core and flakes (Evans).

the old Scandinavian *hamarr*, meaning both rock and hammer.

From beating we come to hacking and cutting. At the earliest times known of man's life on the earth, his pointed and edged instruments of sharp stone are among his chief relics. Even in the mammoth-period he had already learnt not to be content with accidental chips of flint, but knew how to knock off two-edged flakes. This art of flaking flint or other suitable stones is the foundation of stone-implement making. Perhaps the best idea of it may be gained from the Suffolk gunflint makers who at this day carry on the primæval craft, though with better tools and for so different a purpose. Fig. 52 shows a gunflint-maker's core of flint, with the flakes replaced where he has knocked them off, and the mark of the blow is seen which brought away each

flake. The flakes made by Stone Age men for instruments may be three-sided like the Australian flake in Fig. 53 *b*. But the more convenient flat-backed shape *a*, *c*, has been used from the earliest known times. The flint core, Fig. 54 *f*, with the flakes *e* taken from it, shows how by previous flaking or trimming it was prepared for the new flake to come off with a suitable back. The finest flakes are those not struck off, but forced off by pressure with a flaking-tool of wood or horn. The neat Danish flake, Fig. 53 *c*, was no doubt

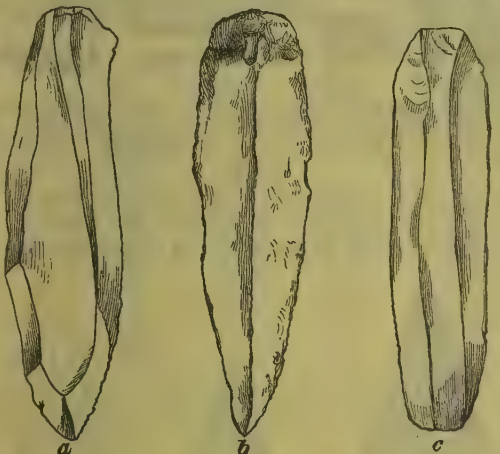


FIG. 53.—Stone Flakes :—*a*, Palæolithic; *b*, Modern Australia; *c*, Ancient Denmark.

made so, and the still more beautiful sharp flakes of obsidian with which the native barbers of Mexico, to the astonishment of Cortes' soldiers, used to shave. A stone flake just as struck off may be fit for use as a knife, or as a spear-head like that in Fig. 58 *a*; or by further chipping it may be made into a scraper, spear-head, arrow-head, or awl, like those in Fig. 54.

The oldest known tribes of men have left in the drift gravels of the quaternary or mammoth-period not only rough flakes like Fig. 53 *a*, but the stone implements already mentioned in the first chapter, of which the drawing is here repeated in Fig. 55. It is not clear

whether any of them were fixed in handles, but there are specimens found which have only one end chipped

FIG. 54.—Later Stone Age (neolithic) implements. *a*, stone celt or hatchet; *b*, flint spear-head; *c*, scraper; *d*, arrow-heads; *e*, flint flake-knives; *f*, core from which flint-flakes taken off; *g*, flint-awl; *h*, flint saw; *i*, stone hammer-head.

to a point, but the other end of the flint left smooth, so that they were evidently grasped in the hand to hack with. When edged all round, as in the figure, this type

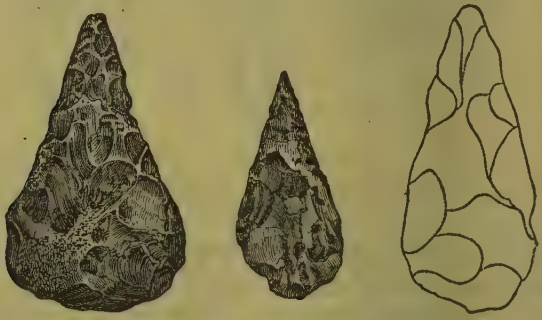


FIG. 55.—Earlier Stone Age (palæolithic) flint picks or hatchets.

would pass into the celt, with its broad end used for chopping. There is nothing to show that the men of the old drift-period ever ground a stone implement to an edge. Thus their stone implements were far inferior to the neatly-shaped and sharp-edged ground celts of

the later Stone Age, Fig. 54 *a*, Fig. 56 *a*. The word celt used for the various chisel-like instruments of rude and ancient tribes is a convenient term, taken from Latin *celtis*, a chisel, in the Vulgate translation of Job xix. 24, "vel celte sculpantur in silice"; "or that they were graven with a chisel (*celte*) in the rock." It is uncertain whence Jerome got the word, which he uses elsewhere, and which has passed on his authority into later language. It may be worth while to mention that the name of the implements called *celts* has nothing to do with the name of the people called *Celts or Kelts*. A stone celt only requires a handle to make it into a

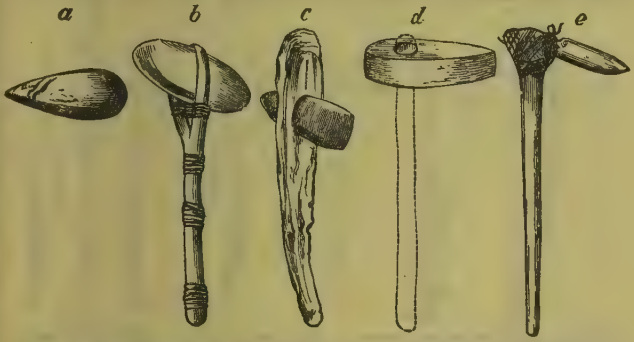


FIG. 56.—Stone Axes, &c. *a*, polished stone celt (England); *b*, pebble ground to edge and mounted in twig handle (modern Botocudo, Brazil); *c*, celt fixed in wooden club (Ireland); *d*, stone axe bored for handle (England); *e*, stone adze (modern Polynesia).

hatchet. This was done very simply by the forest Indians of Brazil, who would pick up a suitable water-worn pebble, rub one end down to an edge, and bind it in a twig, Fig. 56 *b*. Another rude way of mounting a celt was to stick it into a club, so as to form a woodman's or warrior's axe such as *c*, which shows one dug out of a bog in Ireland. The most advanced method was to drill a hole through the stone blade to take the handle as in *d*. When the stone blade is fixed with the edge across, the tool becomes a carpenter's adze, as *e*, which is the instrument used by the canoe-building Polynesians.

When metal came into use, the forms of the stone implements were imitated in copper, bronze, or iron, and though the patterns were of course lightened and

otherwise improved to suit the new material, it may be plainly seen that the stone hatchets and spear-heads in museums are the ancestors (so to speak) of the metal ones made ever since. But also the use of metal brought in new and useful forms which stone was not suited to. An idea of these important changes may be gained by careful looking at the series of metal cutting-instruments in Fig. 57. We begin with *a*, which is an Egyptian bronze battle-axe, not very far changed from the stone hatchet. But *b*, the bronze falchion, carried also by Egyptian warriors, is a sort of axe-blade with the handle not at the back, but shifted down; this convenient alteration could not have been made in the stone hatchet,

FIG. 57.—*a*, Egyptian battle-axe; *b*, Egyptian falchion; *c* and *d*, Bechuana battle-axes; *e*, English horseman's axe (16th century); *f*, German pole-axe (15th century).

which would have broken in the shank at the first blow, while in metal it answers perfectly. In *c* and *d* is seen a remarkable transformation of another kind, where in Africa the iron spear-blade passes into the battle-axe, retaining (as if to show its history) the ogee-section originally characteristic of the missile weapon. The battle-axes thus developed show resemblance to the familiar European form *e*, which however seems to have arisen in a different way, being developed from the hatchet. The pole-axe *f* shows further modification, the lower point of the blade being actually attached to the haft, so as to give greater length and strength to the cutting edge. These instances will serve to give an idea of the varied lines of growth by which edged weapons have assumed their modern shapes. Yet through all it

seems clear that these instruments, whether tools or weapons, or such as, like the bill-hooks of the early English and the modern Malays, served alike for peace and war, may have all originated from early metal instruments, themselves derived from still earlier instruments of stone.

From the early stone spear-heads another set of weapons seem to have gradually arisen, as may be seen in Fig. 58. Looking at the spear from the Admiralty Islands, *a*, the head of which is a large flake of obsidian, it is plain that such a spear, when the shaft is broken

FIG. 58.—*a*, Stone spear-head (Admiralty Is.); *b*, stone spear-head or dagger-blade (England); *c*, iron spear-head knife (Africa); *d*, bronze dagger; *e* bronze leaf-shaped sword.

off short, becomes a dagger. The daggers made by these natives are in fact shaftless spear-heads, and one often cannot tell whether the flint blades of shapes like *b*, which are dug up in Europe, were intended for mounting as spears or as daggers. Now the brittleness of stone was against the use of stone blades more than a few inches long, but when metal came in, the blades could be made long, taper, and sharp, thus developing into two-edged daggers of deadly effect. In old Egyptian pictures warriors are seen armed with spear and dagger, these two weapons having blades of similar shape, so that the dagger may be described as a large spear-head with a hilt to grasp in the hand. It seems as though

the metal dagger, by further lengthening, passed into the two-edged sword, a weapon impossible in stone. To give an idea how this may have come about, Fig. 58 shows specimens, *d* and *e*, from the bronze-period of Northern Europe. Straight two-edged swords may of course be used for cut or thrust, or both. But on placing side by side a one-edged sabre and a two-edged broadsword or rapier, it will not be seen that though both are called swords, and are fitted up with similar hilts, hand-guards, and sheaths, they are nevertheless two weapons of separate nature, the sabre having passed into a form admirably suited for a cutting stroke, while the rapier retains the character of a thrusting weapon, which it inherits from the original spear. This last spear-type, of which one modern development is the bayonet, has mostly served for warlike purposes. Yet it is not unknown as a peaceful implement, as may be seen in African two-edged knives, which are evidently derived from spear-heads; one of these is represented by *c* in the figure, and also in the instrument which our surgeons, conscious of its original model, call the little spear or *lancet*.

To proceed to other kinds of tools. Thorns, pointed splinters of bone, or flint flakes worked to a point (Fig. 54 *g*), served early tribes of men as borers. The saw probably invented itself from a jagged flint flake, which afterwards became the more artificial flint saw, Fig. 54 *h*. Thus the men of the Stone Age had in rude and early forms some of the principal tools, which were improved upon in the ages of metal. It is interesting to look in Wilkinson's *Ancient Egyptians* at the contents of the Egyptian carpenter's tool-basket, where the bronze adze, saw, chisels, &c., show traces of likeness to the old stone implements. On the other hand, this Egyptian set of tools, and still more those of the ancient Greek and Roman carpenters, come remarkably near those we are using at this day. One difference which kept the ancient carpenters below ours was that they had not got beyond nails, never having seized the idea of the screws which are so essential to modern construction, nor of such tools as the screw-auger and gimlet, which depend on the screw for their action. Among the ancient cultured nations of Egypt and Assyria, handicrafts had already come to a stage which could only have been reached by thousands of years of progress. In museums may still be examined the work of their joiners, stone-

cutters, goldsmiths, wonderful in skill and finish, and often putting to shame the modern artificer. Of course these results were obtained by the ancient craftsman with what we should consider a wasteful expenditure of labour. The use of steel and other improvements have given the modern workman great advantages, and, what is more, the modern world has utterly outstripped the ancient in the use of machines, as will be more fully seen presently when the examination of the simpler instruments has been gone through.

To continue the survey of weapons. The cudgel or club is hurled by the hunter or warrior, as when the Zulu will bring down an antelope at a surprising distance with a throw of his round-headed club or knob-kerry, and the Turk till modern times used to throw his mace in battle. The sporting use outlasts the warlike, and even in England the fowler's throwing-cudgel is not unknown in country parts, where it is called a *squoyle*. A flat thin club made curved or crooked by following the branch it is cut out of has been liked by sportsmen of various nations for its destructive whirling flight, as where the old Egyptian fowler may be seen in the pictures flinging his flat curved throw-stick into the midst of a flight of wild-duck. The Australians not only throw wooden clubs and blades as weapons in this ordinary way, but make and throw with surprising skill a peculiar light curved blade which has been called the "come-back" boomerang, which veers in its course and returns to the thrower, as may be seen by flipping cardboard boomerangs with their arms slightly bent out of the plane. Again, it is evident that stones flung by hand must have been among man's first weapons. A simple instrument for lengthening the arm and accumulating momentum is the sling, which is so generally known even among the lowest tribes of man that it is probably of great antiquity.

The rudest spear, which is a mere pointed stick, is known everywhere in the savage world, the point being often hardened by thrusting it into the fire. Of spears, whether such clumsy sticks or more artificially pointed weapons, the heavier kinds serve for thrusting and the lighter for throwing, while intermediate sizes are fit for both purposes. It is obvious how, to prevent the spear from coming out of the wound, it came to be barbed. Another device, known widely among rude hunters and fishers, is to put the point loosely on to the shaft, attach-

ing it by a cord of some length which uncoils when the point sticks in the animal and the shaft drops off, so that the struck beast cannot break away the shaft but drags it trailing, or the fish is held and marked down by the floating wood. The distance to which the spear can be hurled by hand is much increased by using a spear-thrower, acting like a sling. In Captain Cook's time the New Caledonians slung their spears with a short cord with an eye for the finger, while the Roman soldiers had a thong (*amentum*) made fast to their javelins near the middle of the shaft for the same purpose. But wooden spear-throwers from one to three feet long, grasped at one end and with a peg or notch at the other to take the butt of the spear, have been more favoured with savage and barbaric races. Thus Fig. 59 shows the Australian spear-thrower. This looks a more primitive instrument than the bow, which indeed was not known to these rude savages. It seems as though with

FIG. 59.—Australian spear thrown with spear-thrower (after Brough Smyth).

the progress of weapons the spear-thrower was discarded, for it is not found among any nation higher than the old Mexicans; there is a fine specimen in the British Museum of this "atlatl," of which Spanish writers mention the effectiveness. The bow and arrow (as General Pitt-Rivers suggests) may very likely have grown out of a simpler contrivance, the spring-trap set in the woods by fitting a dart to an elastic branch, so fastened back as to be let go by a passing animal, in whose track it discharges the weapon. However invented, the bow came into use in ages before history. Its arrow is a miniature of the full-sized javelin, and the old stone arrow-heads found in most regions of the world (see Fig. 54 *d*) show the existence of the bow-and-arrow in the Stone Age, though hardly back to the drift-period. The art of feathering the arrow goes back as far as history, and we know not how much farther. The simplest kind of long-bow is like that we still use in the sport of archery, made of one piece of tough wood. Fig. 60 *a* shows a long-bow of the forest-tribes of South

America, unstrung, with its string hanging loose. What may be called the Tatar or Scythian bow is formed of several pieces of wood or horn, united with glue and sinews. Shorter than the long-bow, it gets its spring by being bent outside-in to string it; thus the concave side of the Tatar bow *b* when unstrung (as shown by the dotted lines in the figure) becomes the convex side when strung. Bows of this class belong especially to

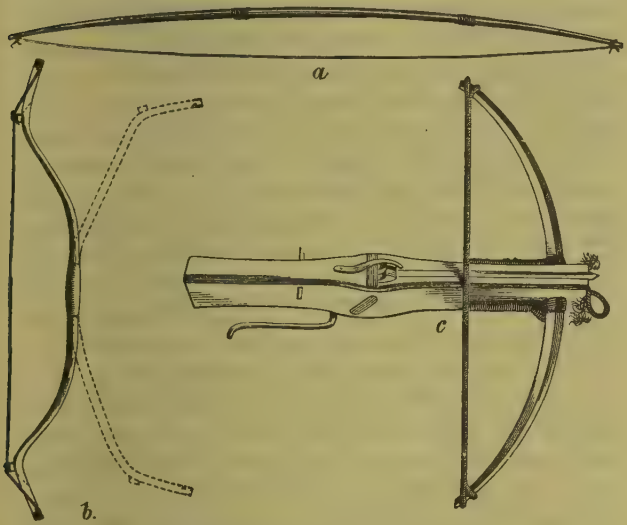


FIG. 60.—Bows. *a*, South American long-bow (unstrung); *b*, Chinese (Tatar bow; *c*, European cross-bow.

northern regions where there is a scarcity of tough wood suited to making long-bows in one piece. As a warlike weapon the bow lasted on in Europe through the Middle Ages, and as late as 1814 the world looked on with wonder to see the Kalmuk cavalry ride armed with bows-and-arrows through the streets of Paris. A further step in the history of the bow was to mount it on a stock, so as to take aim at leisure and touch a trigger to let go the string. Thus it became the cross-bow, which seems to have been invented in the East,

and was known in Roman Europe about the sixth century. In the figure, *c* represents it in its perfected form with a winch to draw the bow, as soldiers used it in the sixteenth century. Cross-bows are still made in Italy for shooting birds with a bolt or pellet.

To understand the next great move in missile weapons, it is necessary to look back to savage life. The blow-tube, through which the forest Indian of South America (Fig. 43) blows his tiny poisoned plug-darts, or the similar Malay weapon called the sumpitan, may have been easily invented wherever long large reeds grew. With simple darts or pellets the blow-tube served for shooting birds, and it is often kept up as a toy, as in our boys' peashooters. When, however, gunpowder was applied in warfare, its use was soon adapted to make the blow-tube an instrument of tremendous power, when instead of the puff of breath in a reed, the explosion of powder in an iron barrel drove out the missile. In the early guns of the Middle Ages, the powder was fired by putting a coal or match to the touchhole, as continued to be done till lately with cannon. For hand-guns, this early match-lock was followed by the wheel-lock. This led up to the flint-lock, which it is curious to compare with the cross-bow, for the bent bow released by the trigger, which in the cross-bow did the actual work of shooting out the missile, has now come down, in the form of a spring and trigger, to the subordinate use of striking the light to ignite the powder which actually propels the ball. In more modern guns, the trigger and spring still remain, the improvement lying in the use of fulminating silver in the cap, ignited by the blow of the hammer. The rifling of the barrel by means of grooves, though introduced to prevent it from fouling, renews in its effect the ancient plan of feathering the arrow to cause it to rotate, this giving increased steadiness of flight. The modern conical shot shows a partial return from the spherical bullet towards the ancient bolt or arrow, and at last breech-loading goes back to the old plan of putting the arrows in at the butt-end of the savage blow-tube.

As thus plainly appears, the ingenuity of man has been eminent in the art of destroying his fellow-men. In surveying the last group of deadly weapons, from the stone hurled by hand to the rifled cannon, there comes well into view one of the great advances of culture. This is the progress from the simple tool or implement,

such as the club or knife, which enables man to strike or cut more effectively than with hands or teeth, to the machine which, when supplied with force, only needs to be set and directed by man to do his work. Man often himself provides the power which the machine distributes more conveniently, as when the potter turns the wheel with his own foot, using his hands to mould the whirling clay. The highest class of machines are those which are driven by the stored-up forces of nature, like the saw-mill where the running stream does the hard labour, and the sawyer has only to provide the timber and direct the cutting.

As to how simple mechanical powers were first learnt, it is of no use to guess in what rude and early age men found that stones or blocks too weighty to lift by hand could be prized up and moved along with a stout stick, or rolled on two or three round poles, or got up a long gentle slope more easily than up a short steep rise. Thus such discoveries as those of the lever, roller, and inclined plane, are quite out of historical reach. The ancient Egyptians used wedges to split off their huge blocks of stone, and one wonders that, knowing the pulley as they did, it never appears in the rigging of their ships (see Fig. 71). A draw-well with a pulley is to be seen in the Assyrian sculptures, where also a huge winged bull is being heaved along with levers, and dragged on a sledge with rollers laid underneath.

The wheel-carriage, which is among the most important machines ever contrived by man, must have been invented in ages before history. To see what constructive skill the leading nations had already attained to in times we reckon as of high antiquity, it is worth while to examine closely the Egyptian war-chariots, with their neatly-fitted and firmly-tired spoke-wheels turning on their axles secured by linch-pins, while the body, pole, and double harness show equal technical skill. In looking for some hint as to how wheel-carriages came to be invented, it is of little use to judge from such high skilled work as was turned out by these Egyptian chariot-builders, or by the Roman *carpentarii* or carriage-builders from whom our *carpenters* inherit their name. But, as often happens, rude contrivances may be found which look as though they belonged to the early stages of the invention. The plaustrum or farm-cart of the ancient world in its rudest form had for wheels two solid wooden drums near a foot thick, and made from a tree-trunk

cut across, which drums or wheels did not turn on the axle but were fixed to it; the axle was kept in place by wooden stops, or passed through rings at the bottom of the cart, and went round together with its pair of wheels, as children's toy carts are made. It is curious to notice how, under changed conditions, the builders of railway-carriages have returned to this early construction. In the ancient cart, Fig. 61, the squared end of the axle shows that it must turn with the wheels. In such countries as Portugal the old classic bullock-cart on this principle is still to be seen, and it has been reasonably guessed that such carts tell the story how wheel-carriages came to be invented. Rollers were early

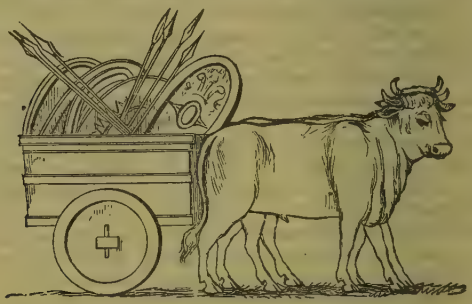


Fig. 61.—Ancient bullock-waggon, from the Antonine Column.

used, on which a block of stone or other heavy weight was trundled. Suppose such a roller made of a smoothed tree-trunk to be improved by cutting the middle part smaller, so that it became an axle and pair of broad wheels in one piece, then, by making this axle work underneath the rudest framework, the simplest imaginable wheel-carriage is made. If the first notion of a cart were suggested, the wheels might afterwards be made separately and pinned on to the square axle, and provided with tires. Then, for light wheels and smooth ground, the wheels would at last be made to turn on fixed axles. This is only conjecture, but at any rate it puts clearly before our minds what the nature of a carriage is.

Another ancient machine is the mill. The rudest tribes of savages had a simple and effective means ready

to hand for powdering charcoal and ochre to paint themselves with, or for the more useful work of bruising wild seeds gathered for food. The whole apparatus consists of a roundish stone held in the hand, and a larger hollowed stone for a bed. It is curious to notice how closely our pestle and mortar still keeps to this primitive type. Now any one using the pestle and mortar may notice that it works in two ways, the stuff being either pounded by striking, or ground by rubbing against the side of the mortar. When people took to agriculture, and grain became a chief part of their food, and mealing it the women's heavy work, forms of mealing-stones came into use suited not for pounding but for grinding only, and doing this more perfectly. An example may be seen in Fig. 62, a rude ancient corn-crusher dug up

FIG. 62.—Corn-crusher, Anglesey (after W. O. Stanley).

in Anglesey, the stone muller or roller having its sides hollowed for the hands of the grinder, who worked it back and forward on the bed-stone. The perfection of such a corn-crusher may be seen in the " metate " with its neatly shaped bed and rolling-pin of lava, with which the Mexican women crush the maize for their corn-cakes or tortillas. But it is by one stone revolving upon the other that grain is best ground, and here we have the principle of the mill. The quern or hand-mill of the ancient world in its simple form consisted of two circular flat mill stones, the upper being turned by a handle, while the grain was poured in through the hole in the centre, and came out as meal all round the edge. This early hand-mill has lasted on into the modern world, and Fig. 63 shows " two women grinding at the mill," as they might be seen in the Hebrides in the last century; the long stick, which hangs from a branch above, has its end in a hole in the upper stone, and a cloth is spread

on the ground to catch the meal. The quern is still used in north Scotland and the islands. If the reader will notice the construction of a modern flour-mill, it will be seen that the neatly faced and grooved millstones are now of great weight, and the upper one balanced on the pivot which gives it rapid rotation from below by means of water or steam-power, but, notwithstanding these mechanical improvements, the essential principle of the primitive hand-mill is still there.

Fig. 63.—Hebrides women grinding with the quern or hand-mill (after Pennant).

Another group of revolving tools and machines begins with the drill. The simplest mode of twirling the boring-stick between the hands is to be seen in fire-making (Fig. 72). In this clumsy way rude tribes know how to bore holes through hard stone by patiently twirling a reed or stick with sharp sand and water. This primitive tool was improved both for making fire and boring holes, by winding round the stick a thong or cord, which by being pulled backward and forward worked the drill, as the ancient shipwrights boring their timbers are described in the Odyssey (ix. 384). The ingenious

plan of using a bow with its string to drive the drill, so that one man can manage it, was already known in the old Egyptian workshops, but the still more perfect Archimedean drill is modern. The turning-lathe seems to have had its origin in the drill. To those who have only seen the lathe in its improved modern forms this may not be clear, but it is seen by looking at the old-fashioned pole-lathe with which the turner used to shape his wooden bowls and chair-legs, which were made to revolve by a cord pulled up and down, on somewhat the same principle as the Homeric drill. The foot-lathe, with its crank and continuous revolution, superseded this, to be itself encroached upon by the introduction of steam-power for driving, and even for applying the tool in the self-acting lathe.

In examining these groups of instruments and machines, the development of many of them has been traced back till their origins are lost in dim præhistoric ages, or to where ancient history can show them arising from a fresh idea or a new turn given to an old one. It is seldom possible to get at the real author of an ancient invention. Thus no one knows exactly when and how that wonderful mechanical contrivance, the screw, appeared. It was familiar to the Greek mathematicians, and the screw linen-presses and oil-presses of classic times look almost modern in their construction. In the period of ancient civilization there appear the beginning of that immense change which is remodelling modern life, by inventions which set the forces of nature to do man's heavy work for him. This great change seems to have been especially brought on by contrivances to save the heavy toil of watering the fields. A simple hand-labour contrivance of this kind is the shadoof of the Nile valley, where a long pole with a counterpoise at one end is supported on posts, and carries a bucket hanging to the longer end to dip up water from below. One need not travel to the East to watch this old contrivance, for it is to be seen at work in our brickfields. For irrigation, it was mechanically an improvement on this to set a gang of slaves to turn a great wheel with buckets or earthen jars at its circumference, which rose full from the water below, and as they turned over emptied themselves into a trough at a higher level. But when such a wheel was built to dip in a running stream, then the current itself would turn the wheel, and thus would come into existence the noria or irrigating water-

wheel often mentioned in ancient literature, and to be seen still at work both in the East and in Europe. By these or some similar steps of invention the water-wheel was made a source of power for doing other work, such as grinding corn, instead of the women at the quern or the slaves at the treadmill, or the mill-horse in his everlasting round. As the Greek epigram says, "Cease your work, ye maids who laboured at the mills, sleep and let the birds sing to the returning dawn, for Demeter has bidden the water nymphs to do your task; obedient to her call, they throw themselves on the wheel and turn the axle and the heavy mill." The classical corn-mill, with the cog-wheels driven by the water-wheel, may have been a good deal like the water-mills still working on our country streams. Such machinery was early applied to grinding corn, and afterwards to other manufactures, so that now the word mill no longer means a grinding-mill only, but is also used where machinery is driven by power for other purposes. It was a great movement in civilization for the water-mill and its companion contrivance the wind-mill to come into use as force-providers, doing all sorts of labour, from the heaviest work of the European factory down to turning the Tibetan prayer-wheels, which go round repeating for ever the sacred Buddhist formula. Within the last century the civilized world has been drawing an immense supply of power from a new source, the coal burnt in the furnace of the steam-engine, which is already used so wastefully that economists are uneasily calculating how long this stored-up fossil force will last, and what must be turned to next—tide force or sun's heat—to labour for us. Thus, in modern times, man seeks more and more to change the labourer's part he played in early ages, for the higher duty of director or controller of the world's force.

CHAPTER IX

ARTS OF LIFE—(*continued*)

Quest of wild food, 163—Hunting, 164—Trapping, 166—Fishing, 168—Agriculture, 169—Implements, 170—Fields, 172—Cattle, pasturage, 173—War, 174—Weapons, 174—Armour, 175—Warfare of lower tribes, 176—of higher nations, 178.

HAVING, in the last chapter, examined the instruments used by man, we have next to look at the arts by which he maintains and protects himself. His first need is to get his daily food. In tropical forests, savages may easily live on what nature provides, like the Andaman Islanders, who gather fruits and honey, hunt wild pigs in the jungle, and take turtle and fish on the coast. Many forest tribes of Brazil, though they cultivate a little, depend mostly on wild food. Of such the rude man has no lack, for there is game in plenty and the rivers swarm with fish, while the woods yield him a supply of roots and bulbs, calabashes, palm-nuts, beans, and many other fruits; he collects wild honey, birds' eggs, grubs out of rotten wood, nor does he despise insects, even ants. In less fertile lands savage life goes on well while game and fish abound, but when these fail it becomes an unceasing quest for food, as where the Australians roam over their deserts on the look-out for every eatable root or insect, or the low Rocky Mountain tribes gather pine-nuts and berries, catch snakes, and drag lizards out of their holes with a hooked stick. The Fuegians wander along their bleak inhospitable shores feeding mostly on shell-fish, so that in the course of ages their shells, with fish-bones and other rubbish, have formed long banks above high-water mark. Such shell-heaps or "kitchen-middens" are found here and there all round the coasts of the world, marking the old resorts of such tribes; for instance on the coast of Denmark, where archæologists search them for relics of rude Europeans, who, in the Stone-age, led a life somewhat like that of Tierra del Fuego. Hunting and fishing go

on through all levels of society, beginning with the savages who have no other means of subsistence, till at last among civilized nations game and fish hardly do more than supplement the more regular supplies of grain and meat from the farm. Looking at the devices of the hunter and fisher, it will be seen how thoroughly most of them belong to the ruder stages of culture.

The natives of the Brazilian forests, to whom tracking game is the chief business of life, do it with a skill that fills with wonder the white men who have watched them. The Botocudo hunter, gliding stealthily through the underwood, knows every habit and sign of bird and beast; the remains of berries and pods show him what creature has fed there; he knows how high up an armadillo displaces the leaves in passing, and so can distinguish its track from the snake's or tortoise's, and follow it to its burrow by the scratches of its scaly armour on the mud. Even the sense of smell of this savage hunter is keen enough to help him in tracking. Hidden behind the trunk of a tree, he can imitate the cries of birds and beasts to bring them within range of his deadly poisoned arrow, and he will even entice the alligator by making her rough eggs grate together where they lie under leaves on the river-bank. If an ape he has shot high in the boughs of some immense tree remains hanging by its tail, he will go up after it by a hanging creeper where no white man would climb. At last, laden with game and useful forest things, such as palm-fibre to make hammocks, or fruit to brew liquor, he finds his way back to his hut by the sun and the lie of the ground, and the twigs that he bent back for way-marks as he crept through the thicket. In Australia, the native hunter will lie in wait behind a screen of boughs near a water-hole till the kangaroos come to drink, or will track one in the open for days, camping by his little fire at night to be ready for the pursuit again at dawn, keeping unseen and to the leeward till at last he can creep near enough to hurl his spear, seldom in vain. When the natives hunt together, they will put up brush-fence in two long wings converging towards a pit, and so drive the kangaroo into it; or they will form a great hunting party for a battue, surrounding half a mile of bush-land, and with shouts and clatter of weapons driving all the game to the centre where they can close round and despatch them with spears and waddies. In fowling the Australians show equal expertness. A native will swim under

water breathing through a reed, or will merely cover his head with water-weed till he gets among a flock of ducks, which one by one he noiselessly pulls under and tucks into his belt. This shows in a simple form a kind of duck-hunting which is found in such distant parts of the world, that travellers have been puzzled to guess whether the idea spread from one tribe to another, or was invented many times. It may be seen on the Nile, where a harmless-looking calabash floats in among the water-fowl, with a swimming Egyptian's head inside. The Australian hunter takes the wallaby (a small kangaroo) by fastening to a long rod like a fishing-rod a hawk's skin and feathers, making the sham bird hover with its proper cry till it drives the game into a bush where it can be speared. Of devices of stalking with an imitated animal, one of the most perfect is that of the Dogrib Indians, when a pair of hunters go after reindeer; the foremost carries a reindeer's head, while in the other hand he has a bunch of twigs against which he makes the head rub its horns in a lifelike way, and the two men, walking as the deer's fore and hind legs, get among the herd and bring down the finest. In England, till of late years, fowlers used to hide behind a wooden horse moved along on wheels, and a relic of this survives in the phrase "to make a *stalking-horse* of one," often now used by people who have no idea what the word meant.

Hunting with dogs was very ancient, and was found among uncivilized tribes; thus the Australians seem to have trained the dingo or native dog for the chase, and most of the North American Indians had their native hunting-dogs. Still, dogs were not so universal among rude tribes as they have been since European breeds were carried all over the world; for instance, the natives of Newfoundland seem to have had no dogs. The largest and fiercest animal whose instinct of prey man has thus taken advantage of is the hunting-leopard or cheetah, which in India or Persia is carried in an iron cage to the field and let loose upon the deer; when it has pounced on the game the huntsman draws it off with the taste of blood and gives it a leg for its share in the partnership. Already in classic times there is mention of birds of prey trained to strike game-birds or drive them into the net, or to pounce on hares. Hawking or falconry reached its height as a royal sport in mediæval Tartary, where Marco Polo describes the Great Khan going out, borne by two elephants in his litter hung with cloth of gold and covered

with lion-skins, to see the sport of his ten thousand falconers flying their hawks at the pheasants and cranes. From the East hawking spread over Europe. It was familiar to our early English ancestors, and if one had to paint a symbolic picture of the Middle Ages, one could hardly choose more characteristic figures than the knight and lady riding out with their hooded hawks on their fists. Since then falconry has all but died out in Europe, and nowadays the traveller may best see it in the Asiatic district where it first came up, Persia or the neighbouring countries. In such sports the quest of food (now often contemptuously called "pot-hunting") becomes subordinate to the excitement of the chase. It was so especially where fleet animals like the deer were hunted on horseback, till at last the royal stag-hunt became a court ceremony with its cavalcades and its great officers of state in splendid uniforms. Such pageantry is, indeed, declining in modern Europe, but the place it used to hold in English court life is shown by noblemen still occupying in the Royal household the places of Master of the Buckhounds and Hereditary Grand Falconer.

The modern hunter has a vastly increased power of killing game, from the use of fire-arms instead of the bow and spear which came down from savage times. The effect of bringing in guns is seen among the native American buffalo-hunters. They were always reckless in destruction when they once came within reach of the herds, but now with the help of the white man and the use of his rifles there is such slaughter that travellers have found the ground and air for miles foul with the carcases of buffalo killed merely for the hides and tongues. In the civilized world, what with killing off game, and what with the encroachment of agriculture on the wild lands, both the supply and the need of game for man's subsistence have much lessened. But the hunter's life has been from the earliest times man's school of endurance and courage, where success and even trial gives pleasure in one of its intensest forms. Thus it has come to be kept up artificially where its practical use has fallen away. In civilized countries it is seen at its best where it keeps closest to barbaric fatigue and danger, like grouse-shooting in Scotland, or boar-hunting in Austria, but at its meanest, where it has come down to shooting grain-fed pheasants as tame as barn-door fowls.

Next, as to trapping game. This was seen in a

curiously simple form in Australia, where a native would lie on his back on a rock in the sunshine with a bit of fish in his hand, pretending to be fast asleep, till some hawk or crow pounced on the bait, only to be itself pounced on by the hungry man, who broiled and ate it then and there. A plan of taking game which must have readily suggested itself to rude hunters was the pitfall, in its simplest shape a mere hole too deep for a heavy beast to get out of when it has fallen in. The savage trapper will dig such a pit, and cover it with brushwood or sods, as in Africa the bushmen take the huge hippopotamus and elephant, while in fur-countries the hunters arrange their pitfalls in various ways, the most artificial plan being to cover them with a wooden floor which upsets when trodden on. The word *trap*, meaning originally step (like German *treppe*), may have come from its usually being some contrivance for the game to tread on. It is so not only with the pitfall, but with other common kinds of trap, which, when the animal steps on the catch, drop down on it, or pull a noose round it, or let fly a dart at it, all which are plans known in the uncivilized world. The art of catching birds and beasts with a noose, held in the hand or fastened to the end of a stick, is universal. Perhaps the most skilful noosing is that done on horseback by the herdsmen of Mexico, though it should be noticed that their *lazo* is not a native American invention; it was brought over by the Spaniards with its name, which is simply Latin *laqueus*, a rope. To use the noose for trapping purposes, it is only necessary to set it in the track where game pass, for them to run their heads into, as the North American Indians do. But the noose may also be attached to a bough bent back so as to spring up when an animal touches it, and catch him. Or a spear may be arranged as the savages of the Malay Peninsula do it, with an elastic bamboo so bent back that when released by the animal it will spear him. The suggestion has been already mentioned (p. 154) that such a spring-trap first led to the invention of the bow and arrow. Actual bows and arrows are set as traps in such countries as Siberia, and the spring-gun is a modern improvement on these.

Lastly, the net is one of the things known to almost all men, so far as history can tell. The native Australians net game like ancient Assyrians or English poachers, and are not less skilled in netting wild fowl. To see this art at its height we may look at the pictures of fowling scenes

on the monuments of ancient Egypt, which show the great clap-nets taking geese by scores; even the souls of the dead are depicted rejoicing in this favourite sport in the world beyond the tomb.

Among the various arts of the fisherman, one common among rude tribes was easily hit upon. Every day at the turn of the tide at river-mouths and on low shores, and inland near streams after a flood, fish are left behind in the shallow pools. Led by this experience, the savage has wit enough to assist nature, as where the Fuegians put up stake fences on the coast at low-water mark, while in South Africa near the rivers large flats are walled in with loose stones ready for the floods. Thus our fish-weirs and fish-dams are no novelties in civilization. Nor is the device of drugging or narcotizing fish a civilized invention, but to be seen in perfection among the tropical forest-tribes of South America, who use for the purpose a score or so of different plants. There is nothing surprising, however, in its being known to men so rude, for it must often occur by accident, from the branches or fruit of the right kind of euphorbia or paullinia falling into some forest pool, an experiment which the observant native would not be slow to try again. Next, a mode of fishing usual among savages, is spearing, the spear for this being barbed, and often made more effective by the head spreading into several barbed prongs. An account of a native Australian fishing describes him lying athwart his bark canoe, with his spear-point dipping into the water ready to go down without splashing, and, what is more remarkable, the fisherman keeping his own eyes under water, so that not only the ripple does not disturb his view, but his aim is not interfered with by the refraction of light which makes it so difficult for a man out of the water to hit an object below the surface. The wilder races also know well how after dark fish come to a light, so that salmon-spearing by torchlight, now that it is no longer so frequent in Scotland or Norway, may be seen in all its picturesqueness among the Indians of Vancouver's Island. Shooting fish with the bow and arrow, which many low tribes do with wonderful dexterity, may be counted as a variety of fish-spearing. The fish-hook is a contrivance not known to all savage tribes, but some have it, as the Australians who cut their hooks out of shell, and are even known to fish with a hawk's claw attached to a line. The ancient Egyptian would sit like a modern European angler by a canal or

pond, fishing with rod and line; his hook was of bronze. The Greeks used artificial flies for "dapping," if not for throwing. On the whole it is remarkable how little modern fishermen have moved from the methods of the rudest and oldest men. The savage fish-spear, with its three or four barbed prongs, is curiously like that our sailors still use, and call a fish-gig. Only we make the head of iron, not of wood and fish-teeth. So it is with the harpoon used by American whalers, with its loosely fitting point which comes off when the fish is struck, only remaining attached by a long cord to the floating shaft; this is copied, but with a steel point, from the bone-headed harpoon of the Aleutian Islanders. Our fishermen carry on their business on a large scale, with their steam-trawlers and seines which sweep a whole bay, but their net-fishing is much of the same kinds as may be found among the peoples from whom we have here taken our early examples of spearing and angling.

Thus man, even while he feeds himself as the lower animals do, by gathering wild fruit and catching game and fish, is led by his higher intelligence to more artificial means of getting these. Rising to the next stage, he begins to grow supplies of food for himself. Agriculture is not to be looked on as a difficult or out-of-the-way invention, for the rudest savage, skilled as he is in the habits of the food-plants he gathers, must know well enough that if seeds or roots are put in a proper place in the ground they will grow. Thus it is hardly through ignorance, but rather from roving life, bad climate, or sheer idleness, that so many tribes gather what nature gives, but plant nothing. Even very rude people, when they live on one spot all the year round, and the climate and soil are favourable, mostly plant a little, like the Indians of Brazil, who clear a patch of forest round their huts to grow a supply of maize, cassava, bananas, and cotton. When we look at the food-plants of the world, it appears that some few are grown much as in their wild state, like the coco-nut and bread-fruit, but most are altered by cultivation. Sometimes it is possible to find the wild plant and show how man has improved it, as where the wild potato is found growing on the cliffs of Chile. But the origin of many cultivated plants is lost to tradition and has become a subject for tale-tellers. This is the case with those edible grasses which have been raised by cultivation into the cereals, such as wheat, barley, rye, and by their regular and plentiful

supply have become the mainstay of human life and the great moving power of civilization. It is clear that the development of these grain-plants from their wild state was before the earliest ages of history, which throws back the beginnings of agriculture to times older still. How ancient was the first tilling of the soil, is shown by ancient Egypt and Babylonia, with their governments and armies, temples and palaces, for it could have been only through carrying on agriculture for a long series of ages that such populations could have grown up so closely packed together as to form a civilized nation. Plants, when once brought into cultivation, make their way from people to people across the globe. Thus the European conquerors of America carried back the maize or Indian corn which had been cultivated from unknown antiquity over the New World, and which now furnishes the Italian peasant with his daily meal of polenta or porridge; it is grown even in Japan, and down to the south of Africa, where it is the "mealies" of the colonist. An English vegetable garden is a curious study for the botanist who assigns to each plant its proper home, and to the philologist who traces its name. Sometimes this tells its story, fairly, as where *damson* and *peach* describe these fruits as brought from Damascus and Persia. But the *potato*, brought over in Queen Elizabeth's time, seems to have borrowed the name of another plant botanically different, the *batata*, or sweet-potato. The luscious tropical *ananas* has lost its native Malay name except among botanists, and has taken the name of the common fir-cone or *pine-apple*, which in shape it so closely resembles.

By noticing how rude tribes till the soil, much is to be learnt as to the invention of agricultural implements. Wandering savages like the Australians carry a pointed stick to dig up eatable roots with, as in Fig. 64 *a*. Considering how nearly planting a root is the same work as digging one up, it is likely that a tribe beginning to till the soil would use their root-digging sticks for the new purpose; indeed, a pointed stake has been found as the rude husbandman's implement both in the Old and New World. It is an improvement on this to dig with a flat-bladed tool like a spear, sword, or paddle, and thus we have the civilized spade. A more important tool, the hoe, is derived from the pick or hatchet. The wooden picks of the New Caledonians serve both as weapons and for planting yams, while the African's

hatchet—an iron blade stuck in a club—only has to have the blade turned across to become his hoe. It is curious to find in Europe the rudest imaginable hoe, less artificial than the elk's shoulder-blade fastened to a stick, with which the North American squaws hoed their Indian corn. This is the Swedish "hack," Fig. 64 *b*, a mere stout stake of spruce-fir with a bough sticking out at the lower end cut short and pointed. With this primitive implement in old times fields were tilled in Sweden, and it was to be seen in forest farm-houses within a generation or two. Swedish tradition records the steps by which agriculture improved. The wooden hack was made heavier and dragged by men through the ground, thus ploughing a furrow in the simplest way; then the implement was made in two pieces, with a handle for the ploughman and a pole for the men to drag by, the share was shod with an iron point, and at last a pair of cows or mares were yoked on instead of the men. This seems nearly the way in which, thousands of years earlier, the hoe first passed into the plough. Fig. 65 is from a picture of agriculture in ancient Egypt. Here the labourer is seen following the plough to break up the clods with his peculiar hoe, with its long, curved, wooden blade roped to the handle. Now looking at the plough itself, it is seen to be such a hoe, rope and all, only heavier and provided with a pair of handles for the ploughman to guide and keep it down, while a yoke of oxen drag it through the ground. The valley of the Nile was one of the districts where high agriculture earliest arose, and in the picture here copied we may almost fancy ourselves seeing at its birth the great invention of the plough. To arm it with a heavy metal ploughshare, to shape this so that it shall turn the sod

FIG. 64.—*a*, Australian digging-stick; *b*, Swedish wooden hack.

over in a continuous ridge, to fix a coulter or " knife " in front to give the first cut, and to mount the whole on wheels; all these were improvements known in Rome in the classical period. In modern times we have the self-acting plough no longer needing the ploughman to follow at the plough-tail, and the steam-plough has a more powerful draught than oxen or horses. Yet those who have looked at the earlier stages can still discern in the most perfect modern plough the original hoe dragged through the ground.

There survives even now in the world a barbaric mode of bringing land under cultivation, which seems to show us man much as he was when he began to subdue the primæval forest, where till then he had only wandered, gathering wild roots and nuts and berries. This primitive

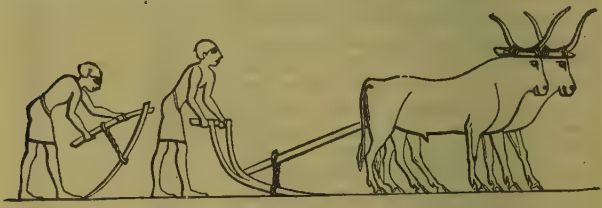


FIG. 65.—Ancient Egyptian hoe and plough.

agriculture was noticed by Columbus, when landing in the West Indies he found the natives clearing patches of soil by cutting the brushwood and burning it on the spot. This simple plan, where the wood is not only got out of the way, but the ashes serve for dressing, may still be seen among the hill-tribes of India, who till these plots of land for a couple of years and then move on to a new spot. In Sweden this brand-tillage, as it may be called, is not only remembered as the old agriculture of the land, but in outlying districts it has lasted on into modern days, giving us an idea what the rough agriculture of the early tribes may have been like when they migrated into Europe. It is not to be supposed, on looking at an English farm of the present day, that its improvements were made all at once. The modern farming system has a long and changing history behind it. One interesting point in its growth is that in long-past ages much of Europe was brought under cultivation by village-communities. A clan of settlers would possess them-

selves of a wide tract of land, and near their huts they would lay out great common fields, which at first they perhaps tilled and reaped in common as one family. It became usual to parcel out this tillage land every few years into family lots, but the whole village-field was still cultivated by the whole community, working together in the time and way settled by the village elders. This early communistic system of husbandry may still be seen not much changed in the villages of such countries as Russia. Even in England its traces have out-lasted the feudal system, and remain in the present days of landlord and tenant. In several English counties there may still be noticed the boundaries of the great common-fields, divided lengthwise into three strips, which again were divided crosswise into lots, held by the villagers; the three divisions were managed on the old three-field system, one lying fallow while the other two bore two kinds of crops.

Next, as to the history of domesticating animals for food. The taming of sociable creatures like parrots and monkeys is done by low forest tribes, who delight in such pets; and very rude tribes keep dogs for guard and hunting. But it marks a more artificial way of life when men come to keep and breed animals for food. The move upwards from the life of the hunter to that of the herdsman is well seen in the far north, the home of the reindeer. Among the Esquimaux the reindeer was only hunted. But Siberian tribes not only hunt them wild, but tame them. Thus the Tunguz live by these herds, which provide them not only with milk and meat, but with skins for clothing and tents, sinews for cord, bone and horn for implements, while as they move from place to place the deer even serve as beasts of draught and burden. Here is seen a specimen of pastoral life of a simple rude kind, and it is needless to go on describing at length the well-known life of higher nomad tribes, who shift their tents from place to place on the steppes of Central Asia or the deserts of Arabia, seeking pasture for their oxen and sheep, their camels and horses. There is a strong distinction between the life of the wandering hunter and the wandering herdsman. Both move from place to place, but their circumstances are widely different. The hunter leads a life of few appliances or comforts, and exposed at times to starvation; his place in civilization is below that of the settled tiller of the soil. But to the pastoral nomad, the hunting which is

the subsistence of the ruder wanderer has come to be only an extra means of life. His flocks and herds provide him for the morrow, he has valuable cattle to exchange with the dwellers in towns for their weapons and stuffs, there are smiths in his caravan, and the wool is spun and woven by the women. What best marks the place in civilization which the higher pastoral life attains to, is that the patriarchal herdsman may belong to one of the great religions of the world; thus the Kalmuks of the steppes are Buddhists, the Arabs are Moslems. A yet higher stage of prosperity and comfort is reached where the agricultural and pastoral life combine, as they already did among our forefathers in the village communities of old Europe just described. Here, while the fields were cultivated near the village, the cattle pastured in summer on the hills and in the woodlands belonging to the community, where also the hunter went for game, while nearer home there were common meadows for pasture and to provide the hay for the winter weather, when the cattle were brought under shelter in the stalls. In countries so thickly populated as ours is now, the last traces of the ancient nomad life disappear when the herds are no longer driven off to the hills in summer.

After the quest of food, man's next great need is to defend himself. The savage has to drive off the wild beasts which attack him, and in turn he hunts and destroys them. But his most dangerous foes are those of his own species, and thus in the lowest known levels of civilization war has already begun, and is carried on against man with the same club, spear, and bow used against wild beasts. General Pitt-Rivers has shown how closely man follows in war the devices he learnt from the lower animals; how his weapons imitate their horns, claws, teeth, and stings, even to their venom; how man protects himself with armour imitated from animals' hides and scales; and how his warlike stratagems are copied from those of the birds and beasts, such as setting ambushes and sentinels, attacking in bodies under a leader, and rushing on with war-cries to the fight.

We have already in the last chapter examined the principal offensive weapons. The daubing on of venom to make them more deadly is found among low tribes far over the world. Thus the Bushman mixes serpent's poison with the euphorbia juice, and the South American native poison-maker, prepared by a long fast for the mysterious act, concocts the paralysing *urari* or *curare*

in the secret depths of the forest, where no woman's eye may fall on the fearful process. Poisoned arrows were known to the ancient world, as witness the lines which tell of Odysseus going to Ephyra for the man-slaying drug to smear his bronze-tipped arrows; but Ilos would not give it, for he feared the ever-living gods. Thus it seems that in early ages the moral sense of the higher nations had already condemned the poisoned weapons of the savage, with something of the horror Europeans now feel in examining the Italian bravo's daggers of the Middle Ages, with their poison-grooves imitated from the serpent's tooth.

How the warrior's armour comes from the natural armour of animals is plainly to be seen. The beast's own hide may be used, as where one sees in museums the armour of bear-skins from Borneo, or breastplates of crocodile's skin from Egypt. The name of the *cuirass* shows that it was at first of leather, like the *buff* jerkin. The Bugis of Sumatra would make a breastplate by sewing upon bark the cast-off scales of the ant-eater, overlapping as the animal wore them; and so the natural armour of animals was imitated by the Sarmatians, with their slices of horses' hoofs sewed together in overlapping scales like a fir-cone. Such devices, when metal came in, would lead to the scale armour of the Greeks, imitated from fish-scales and serpent-scales, while their chain-mail is a sort of netted garment made in metal. The armour of the Middle Ages continued the ancient kinds, now protecting the whole body with a suit from head to foot (*cap-à-pie*) of iron scales, or mail (that is, meshes), or of jointed plates of iron copied from the crab and lobster, such as the later suits of armour which decorate our manorial halls. With the introduction of gunpowder, armour began to be cast aside, and, except the helmet, what remains of it in military equipment is more for show than use. The shield also, once so important a part of the soldier's panoply, has been discarded since the days of musketry. Our modern notion of a shield is that of a large screen behind which the warrior can shelter himself, but this does not appear to have been the original intention. The primitive shield was probably the parrying-shield, used like the narrow Australian parrying-stick, which is only four inches across in the middle where it is grasped, but with which the natives ward off darts with wonderful dexterity. The small round Highland target, one of the varieties of shield

which remained latest in civilized Europe, is made to be thus dexterously handled as a weapon of defence, to ward off javelins, or parry the thrust of spear or sword. It is easy to see that such parrying-shields belong to the early kind of warfare where the battle was a skirmish, and every warrior took care of himself. But when fighting in close ranks began, then the great screen-shields would come in, serving as a wall behind which the old Egyptian soldiers could ensconce themselves, or the Greek or Roman storming-party creep up to the foot of the wall in spite of stones and darts hurled down on them.

The savage or barbarian is apt to fall on his enemy unawares, seeking to kill him like a wild beast, especially where there is bitter personal hatred or blood-vengeance. But even among low tribes we find a strong distinction drawn between such manslaughter and regular war, which is waged not so much for mutual destruction as for a victory to settle a quarrel between two parties. For instance, the natives of Australia have come far beyond mere murder when one tribe sends another a bunch of emu-feathers tied to the end of a spear, as a challenge to fight next day. Then the two sides meet in battle array, their naked bodies terrific with painted patterns, brandishing their spears and clubs, and clamouring with taunts and yells. Each warrior is paired with an opponent, so that the fight is really a set of duels, where spear after spear is hurled and dodged or parried with wonderful dexterity, till at last perhaps a man is killed, which generally brings the fray to an end. Among the rude Botocudos of Brazil, a quarrel arising from one tribe hunting hogs on another's ground might be settled by a solemn cudgelling-match, where pairs of warriors belaboured one another with heavy stakes, while the women fought by scratching faces and tearing hair, till one side gave in. But if in such an encounter the beaten party take to their bows and arrows, the scene may change into a real battle. When it comes to regular war, the Botocudos will draw up their men fronting the enemy, pouring in arrows, and then rushing together with war-whoops to fight it out tooth and nail, killing man, woman, and child. They make expeditions to plunder the villages of their settled neighbours, and when enemies are near in the forest they will stick splinters in the ground as caltrops to lame them, and shoot from ambush behind fallen trunks or shelters of

boughs. The slain in battle they will carry off to cook and devour at the feast, where with wild drunken dancing their warlike zeal is inflamed to frenzied rage. Thus to excite courage is the purpose of the frantic war-songs and war-dances, which are common to mankind, among savages and even far more cultured nations. Low tribes also keep up the fierce hatred and pride of battle by trophies of the enemy—his head dried and hung as an ornament of the hut, or his skull fashioned into a drinking-cup. The wars of the North American Indians have picturesque incidents often described in our books, the braves smoking in solemn council of war, the declaration of war by the bundle of arrows wrapped in a rattlesnake's skin, or the blood-red war-hatchet struck into the war-post, the recruiting-feast where the dog was eaten as emblem of fidelity, the war-party creeping through the woods in single line (which we thence call "Indian file"), the stealthy attack on the enemy's camp or village, the wild scalp-dance of the returning victors, the torturing of the captives at the stake, where the very children were set to shoot arrows at the helpless foe, who bore his torments without a groan, boasting of his own fierce deeds and taunting his conquerors in his death-agony. Indian war was "to creep like a fox, attack like a panther, and fly like a bird." Yet at times the warriors of two tribes would meet in fair battle, standing to watch duels between pairs of champions, or all rushing together in a general melée.

In the warfare of rude races, it is to be noticed how fighting for quarrel or vengeance begins to pass into fighting for gain. Among some tribes the captives, instead of being slain, are brought back for slaves, and especially set to till the ground. By this agriculture is much increased, and also a new division of society takes place, to be seen still arising among such warlike tribes as the Caribs, where the captives with their children come to form an hereditary lower class. Thus we see how in old times the original equality of men broke up, a nation dividing into an aristocracy of warlike freemen, and an inferior labouring caste. Also forays are made for the warriors to bring home wives, who are the slaves and property of their captors. Milder imitation of this hostile wife-capture appears in the custom, widely prevailing among the ruder peoples of the world, and lasting on even among the more civilized, of carrying off brides from families at peace, as a recognized mode of

marriage. As property increases, there appears with it warfare carried on as a business, by tribes living more or less by plunder, glorying in their murderous profession, and despising the mean-spirited farming villagers whose labour provides them with corn and cattle. A perfect example of such a robber-tribe were the Mbayas of South America, whose simple religion it was that their deity, the Great Eagle, had bidden them live by making war on all other tribes, slaying the men, taking the women for wives, and carrying off the goods.

War among civilized nations differs from that of savage tribes in being carried on with better weapons and appliances, and by warriors being trained to fight in regular order. The superiority of a regular army to a straggling savage war-party may be well seen by looking at the pictures in Wilkinson's *Ancient Egyptians* of troops marching in rank and step to sound of trumpet, especially noticing the solid phalanx of heavy infantry with spear and shield. The strength of such Egyptian solid squares of 10,000 men is described in the Cyropædia (probably with truth as to military tactics if not to actual history), how they could not be broken even by the victorious Persians, but amid the rout of man and horse the survivors still held out, sitting under their shields, till Cyrus granted them honourable surrender. An Egyptian army had its various corps divided into companies, and commanded by officers of regular grades. In battle the heavy immovable phalanx held the centre, the archers and light infantry in the wings acted in line or open order, there were bodies of slingers, and the noble warriors drove their chariots into the thick of the opposing host. This military efficiency was attained by having a standing army formed by a regular military class, trained from youth in the art of war, and maintained by eight acres of land assigned to every soldier. From an early time also we find the Egyptians employing foreign mercenary troops, whose peculiar costumes and faces are conspicuous in the battle-pictures. Thus also the Assyrian war-scenes show that their military system was on a level with that of Egypt. The rise of the science of war to a higher stage belongs to Greece, and the whole history of its growth is told in Greek literature. Beginning with the Iliad, the descriptions there show war and armies in a state more barbaric than in Egypt, with little discipline and less generalship, and encounters of Greek and Trojan champions with the armies looking

on as savages would do. But when we come to later ages of Greek history, it is seen that they had by that time not only learnt what the older civilization had to teach, but had brought their own genius to develop it further. Their corps of all arms, archers, charioteers, cavalry, and the phalanx of spearmen, were disciplined and ranged in order of battle much after the ancient Egyptian and Assyrian manner. But whereas in old times a battle had been a trial of mere strength between two armies drawn up facing one another, the military historian, Xenophon, describes the change made in the art of war by the Theban leader, Epaminondas, when at Leuktra, with forces fewer than the Spartans, he charged with his men in column fifty deep against their twelve deep right wing, and by breaking them threw the whole line into disorder, and won the battle. At Mantineia, carrying out this plan yet more skilfully, he arranged his troops in a wedge-shaped body with the weaker divisions slanting off behind so as to come up when the enemy's front was already broken. In such ways was developed the science of military tactics, which made skilful manœuvring as important as actual fighting. The Romans, a nation drilled to battle and conquest, came at last to rule the world by the mere force of military discipline. In the Middle Ages the introduction of gunpowder increased the killing-power of troops whose artillery from bows and arrows became muskets and heavy cannon. The reader's attention has been already drawn to the military scenes of Egypt and Assyria. If now, fresh from watching the manœuvres of a modern army in sham fight, he will look at these pictures to see war as it was three or four thousand years ago, he will observe how substantially the new system is founded on the old, with developments due to two new ideas, namely, tactics and the use of fire-arms.

Somewhat the same lesson may be learnt by comparing the older and ruder kinds of fortification and siege with those of modern times. Tribes at the level of the Kamchatkans and the North American Indians knew how to fortify their villages with embankments and palisades. In ancient Egypt and Assyria and neighbouring countries, strong and high fortress-walls and towers were defended by archers and slingers, and attacked by storming-parties with scaling-ladders. Old sieges were unscientific, as is so curiously seen in the Homeric poems, where the Greeks encamp over against Troy, but seem to

have no notion of regularly investing it, much less of attack by sap and trench. The Greeks and Romans came on to use higher art in fortification and siege, and there appear among them machines of war such as the ancient battering-ram, heavy and skilfully engineered, while contrivances of the nature of huge bows like the catapult led up to the cannon of later ages which superseded them.

Lastly, looking at the army system as it is in our modern world, one favourable change is to be noticed. The employment of foreign mercenary troops, which almost through the whole stretch of historical record has been a national evil alike in war and peace, is at last dying out. It is not so with the system of standing armies which drain the life and wealth of the world on a scale more enormous even than in past times, and stand as the great obstacle to harmony between nations. The student of politics can but hope that in time the pressure of vast armies kept on a war-footing may prove unbearable to the European nations which maintain them and that the time may come when the standing army may shrink to a nucleus ready for the exigencies of actual war if it shall arise, while serving in peace-time as a branch of the national police.

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